TERMITES in TORONTO

A Review and Evaluation of Toronto's Termite Control Program

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT

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Prepared in Co-operation with the
Department of Buildings and Inspections

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This study was carried out by Anwar Jafri, currently Senior Research Officer in the Research and Information Section, City of Toronto Planning and Development Department. The initial phases of the study were carried out in 1981 while Mr. Jafri was on the staff of the Buildings and Inspections Department.

The recent issuance of the paper Termites in Toronto, by A. Jafri of the Planning and Development Department, brings into bold relief the current status of the termite problem in Toronto and the Municipality's efforts to manage the termite control programs of the past.

A. Jafri's excellent study document includes general recommendations which provide broad, flexible concepts within which the Department of Buildings and Inspections can develop a sound termite pest management program.

Dr. R.V. Carr
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May 30, 1983

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1. INTRODUCTION

This study is a comprehensive review of the termite problem in the City of Toronto, and of the City's termite control program to date. As such, it provides the basis for continuing work now underway by the City's consulting entomologist, Dr. R.V. Carr. Dr. Carr has reviewed the study's text and concurs in its recommendations.

Through statisitics and maps, this study provides up to date documentation on the distribution and intensity of infestation in different parts of the City. The statistics are based mainly on the number of houses treated between 1965 and 1982, mostly under the termite control grants program, and the number of City blocks where such houses are located.

The purpose of the study is to draw the attention of the City administration and of the senior levels of Government to the seriousness of the termite problem in the City, to point out the areas where action is required, and to make recommendations for dealing more effectively with the problem. The study will also be of interest to professionals in the housing, building, planning and development, entomology, environment and pest control fields.

The study was carried out by Anwar Jafri, Senior Research Officer in the Research and Information Section of the City of Toronto Planning and Development Department, at the instance and with the co-operation of the City's Buildings and Inspections Department. The initial phase of the study was carried out in 1981 when the author was still a member of the latter department. The raw primary data for the study were drawn from the records of that department.

2. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

2.1 Summary of Report

Termites were first discovered in the City in 1938, and their existence has now been documented throughout Metropolitan Toronto as well as some of the neighbouring municipalities, such as Mississauga and Markham.

This report includes a description of the eastern subterranean termites and the way in which they damage properties. It shows that comparatively little is known about the biology and behaviour of the type of termite found in the Toronto area, and stresses the urgent need for further research on the insect and on alternatives to presently available means of control. The report also includes some material on carpenter ants which are covered under the City's termite control program; these represent a lesser threat and are easier to treat.

Since 1965 the City has had a termite control program which, to date, has been successful in the treatment of more than 3000 houses eligible for provincial and City grants. Because of limited financial, inspection and administrative resources, it has not been possible for the City to enforce its termite-control by-law beyond residential properties eligible for termite control grants, even though the by-law is applicable to all properties.

The number of houses treated in the City has been doubling every five years since the inception of the Termite Control Program. Part of the growth in the number of houses inspected and treated for termites probably results from greater awareness of the problem by homeowners and improved Provincial grants, but part is undoubtedly a result of increased termite activity. Though the problem is most serious in the east end, treatment is now occurring at a faster rate in the west end and in Ward 5.

Under the present Provincial policy and program, owners of infested homes or of adjoining homes are eligible for termite control incentive grants. Individual owners of new homes (not builders) are also eligible for chemical pre-treatment of their sites in areas known for termites. (If the changes proposed by the recent Provincial Green Paper are implemented, the Provincial grants will be reduced from a maximum of $2,000 to $750). The availability of grants has been limited by the small amount of funds appropriated by the Province for termite control. Limited allocation of funds does not permit significant amounts to be given as incentive grants for preventative treatment in areas of known infestation where houses will likely be targets of termites sooner or later. However, the Green Paper's proposal, if it implies entire block treatment, is not practical. If implemented at the current rate of treatment, it would take 50 years to cover all presently infested blocks, let alone those that would become

infested in the meanwhile. Moreover, further research on the long term effects of such large scale chemical treatment should precede any program of this sort.

From Kincardine to Metropolitan Toronto termite infestation has been recorded in 24 municipalities in Southern Ontario and could potentially spread to all the major population centres of the country. In the U.S.A., where the problem is much more widespread, annual property losses related to termite damage and control exceed losses from fire. Estimates range from $100 million to $3.5 billion annually. The figure most commonly quoted is $500 million. In Toronto infestation has already been recorded in more than 360 or 15% of the City blocks which contain about 22,000 or 15% of the City's house form (non apartment type) dwellings. However, in the last two years alone, infestation has been recorded in 81 more City blocks containing more than 4,000 houses. Based on the present rate of about 400 houses being approved for treatment annually, it is estimated that annual termite-related losses to owners of residential properties within Toronto, not allowing for any effect on real estate values, are roughly $1.3 million.

A follow-up survey of treated houses was done with a view to evaluating the effectiveness of treatment (see Chapter 11). The field survey confirmed that the treatment was successful in about 96% of the cases. However treatment of specific properties or areas does not prevent termites still existing in their colonies elsewhere from spreading to and attacking untreated areas. Until there is a major scientific break-through whereby the insects can be eradicated before they attack, remedial and preventative chemical treatment of properties will continue to be the only significant means of protection.

The Ontario Building Code requires certain practices to be followed in the construction of new buildings as protection against termites, including the use of pressure treated wood in areas of termite infestation. The concerns of City officials about the feasibility of using pressure treated wood, as noted in the report, need to be resolved in consultation with the Provincial officials responsible for the Ontario Building Code.

A review and evaluation of the administration of the City's Control Program points out the need for establishing improved record keeping, including computer programs for storage and retrieval of data, with a view to improving monitoring and evaluation capabilities of the program.

The study also points out the need for much more vigorous and concerted policies and programs on the part of all levels of government, to deal with the serious problem of termites in Metropolitan Toronto with the urgency that it deserves.

2.2 Conclusions

Though the Termite Control Program has succeeded in minimizing and preventing damage to the houses treated with the help of provincial and City grants, it cannot prevent termites from infesting thousands of yet unprotected homes. Prevention of the insect from infesting untreated properties cannot be guaranteed unless new scientific methods are developed for its eradication before it attacks properties. Until then, the presently known remedial and preventative measures in regard to individual properties will need to be employed as the only effective means of protection.

In the battle against termites this study points out the need for action in several key areas:

- Research and development aimed at:
  - finding scientific means of detecting and eradicating termites before they attack properties;
  - finding equally effective but environmentally safer alternatives to the insecticides presently in use for treating and preventing termite infestation.
- An expanded program of grants and treatment of buildings not yet infested but within or close to the areas susceptible to infestation.
- An improved public awareness and education program, aimed particularly at new homeowners in termite-prone areas, carried out by municipalities with provincial support.
- An expanded Termite Control Program in the City of Toronto, including sufficient resources for:
  - a more active inspection program that does more than just respond to requests;
  - inspection and enforcement of non-residential properties as well as housing;
  - adequate and timely record keeping, at City, Metro and Provincial levels, including computer storage and retrieval of data, to allow for ongoing monitoring of infestation and evaluation of the Program.
- Resolution of the technical issue, by the City and Provincial officials concerned, whether or not the use of pressure treated wood, permitted in areas affected by termites by the Ontario Building Code, is actually feasible without losing its

immunity against termites in the process of construction through cutting, etc.

- A strategy for dealing with the implications for termite control of the increasing use of wood by homeowners in features or structures not regulated by the Ontario Building Code, such as decks, fences, flower boxes and other landscaping elements.

Termites are a threat to all buildings in which wood is used, especially housing in southern Ontario and potentially across Canada. This underlines the needs for a federal (Canada Mortgage and Housing Corporation) role, as well as a continuing and expanded role by the Ontario government, more particularly its Ministry of Municipal Affairs and Housing, in the ongoing battle against termites.

2.3 Recommendations

1. That this study be adopted as a basis of continuing work by Dr. Richard V. Carr, the City's Consulting Entomologist.

2. That, in order for the City to be able to monitor the full extent of infestation and treatment, the Ontario Ministry of the Environment be requested to ask the operators licensed by it for termite control to notify it of the properties treated by them outside the grants program, and that the Ministry then pass on this information regularly to the City.

3. That the Buildings and Inspections Department in conjunction with the Planning and Development and Management Services Departments, make arrangements for monitoring and evaluation of the termite problem and the program through specially designed computer programs for the storage and retrieval of all relevant data.

4. That the Buildings and Inspections Department undertake planned block inspections for termite infestation beginning in heavily infested areas whil the environmental effect of the insecticides presently in use is being determined.

5. That copies of this Study be sent to the Federal Minister responsible for housing (C.M.H.C.) and the Ontario Ministers of the Environment and Municipal Affairs and Housing, requesting them to:

   (a) As a matter of urgency, commit funds for and actively encourage scientific research into the biology and behaviour of eastern subterranian termites in urban areas; possible negative long range impact of the use of Chlordane; and development of effective but environmentally safer methods of not only treatment of

infestation but also for detection and eradication of the insect before it is able to attack structures.

(b) Recognize, as part of both governments' already declared policy respecting preservation of existing housing, that the termite problem in Toronto is a threat to housing, and to endorse the Buildings and Inspections Department committment to block inspection commencing in heavily infested areas.

6. That a copy of this study be forwarded to the Provincial Minister responsible for the Ontario Building Code with a view to resolving the concern of the City's officials about the feasibility of the use of pressure treated wood in buildings and structures in areas of termite infestation.

7. That copies of this study be sent to the University of Toronto, York University and Guelph University, emphasizing the need for further scientific research on termites.

8. That copies of this study be sent to all Ontario municipalities known to have been subject to termite infestation.

At its meeting on July 11, 1983, City Council adopted the foregoing recommendations along with a further recommendation added by the City's Neighbourhoods Committee at that Committee's meeting on June 29, 1983, viz:

9. That the Commissioner of Buildings and Inspections be requested to report on the feasibility of requiring a report from a licensed termite exterminator when a property is either listed for sale or sold.

3. TERMITES AND CARPENTER ANTS

This study is focussed mainly on the problem of termites which, compared with other wood destroying insects, represent the most serious threat in terms of property damage and cost of treatment, etc. However, it should be pointed out that both the enabling provincial legislation (Section 46, Subsections 22 and 23 of The Planning Act(3) and the City's Termite Control Program apply to termites and to other wood destroying insects including carpenter ants.

The earlier provincial subsidy to a maximum of $125 per dwelling available from the then provincial Ministry of Housing, was also applicable to carpenter ants until it was replaced at the end of 1977 by the Ministry of the Environment grants which are restricted to treatment of termite infestation alone. However, the City's own grant of up to $125 still continues to be applicable to treatment of carpenter ant infestation. There have been no instances so far of treatment for infestation by insects other than termites and carpenter ants.

Under the general umbrella of the Termite Control Program the City's Buildings and Inspections Department has so far maintained its records in terms of the total number of houses treated for infestation under the program. In view of their small numbers (less than 10% of all cases), until recently no separate statistics were maintained by the department for the number of houses treated for carpenter ant infestation.

Therefore the readers are advised that, unless stated otherwise (e.g. in regard to Wards 10 and 11), the statistics, diagrams and maps used in this report for the period from 1965 to 1982 (in terms of number of grants, number of houses treated, number of blocks infested, etc.), represent the total cases dealt with under the umbrella of the Termite Control Program with no separate breakdowns related to the two species of insects.

In view of their small number, inclusion of cases of carpenter ant infestation in the overall statistics does not significantly distort the findings in regard to the problem of termites. The one exception to this is in the north end (Wards 10 and 11) where infestation has so far been totally accounted for by carpenter ants.

3.1 Termites - Description

Extensive literature is available about the biological and other aspects of the Eastern Subterranean Termite, Reticulitermes flavipes (Kollar), found in Ontario and referred to here simply as termites. Only a brief description is given here to be of help in a basic understanding of the insect and the damage it can cause to property. Termites are indigenous to wooded areas and their

permanent habitat is in colonies in moist soil. Their basic food is cellulose found in wood or wood products. The main colonies are generally located underground at undetermined depths and, in most cases, are almost impossible to detect. Occasionally colonies may be found to exist in certain varieties of trees. From the colonies the worker termites go out in search of food and attack easily accessible wood. In the winter, it is assumed they can move below the frost line and survive in a semi dormant state. Because of their thin and highly fragile skin termites are subject to rapid dehydration and can withstand only limited exposure to sunlight and dry conditions. For travelling between the colony and source of food termites build earthen shelter tubes over concrete, metalic or even treated wood surfaces of foundations, walls, sills, joists, water pipes, etc. The tubes, with a diameter of about 6 mm, are built with soil particles, salivary secretions and excrement and provide a protected and moist passageway. Their presence in a structure is a sign of termite attack.

Termites are stratified social insects, divided mainly into: (a) reproductive kings and queens; (b) secondary reproductives; (c) the soldiers who guard the colony against intruders and predators; and (d) the workers, who procure food, feed the reproductives and the soldiers, take care of eggs and the young ones and perform other chores to sustain the life of the colony.

The worker termites are the ones which are found most commonly in infested wood and which do the actual damage to the property. The workers constitute the majority of the insects in a colony. They are blind and sexless and develop no wings. They cause damage to wood with their saw-toothed jaws.

In size and appearance the worker resembles a grain of rice. After feeding itself on wood and digesting it, the worker regurgitates it in the form of food and feed it to the king, the queen, the soldiers and the young ones.

Worker termites can eat up the inside of wood, leaving no outward sign of damage. A shell of surface is always left intact for self protection against dry air while they do their damaging work. Their presence in a structure, therefore, may not be discovered before considerable damage has already occurred.

Older structures may be more vulnerable to termites, but they can damage any building or structure, old or new, where wood is used in direct contact with soil, or is close to the ground, or is easily accessible through holes, cracks, etc. Also, dampness in a building can create conditions favourable to termites. Structures on sandy wet and sandy clay soils are more vulnerable to termites than structures located on clay or heavy soils.

Termites are attracted more to decaying and damp wood but they are also quite capable of feeding on sound and dry wood. They can easily bypass non-wooden or even wood surfaces which have been treated with toxic chemicals by building shelter tubes over such surfaces, giving them access to the wooden structural members of a building.

If, because of treatment or other preventive measures a termite colony is denied access to its source of food in a structure, it sends out foragers to find out and attack new sources. This, it is assumed, along with transportation of infested wood or top soil, may explain the spread of termites in Ontario. Swarming of mature winged adults has contributed largely to their spread in the U.S.A. but apparently occurs in Ontario at such a small scale that it does not significantly affect their spread here.

Because of the difficulty of locating and destroying their colonies it is almost impossible to eradicate termites at the present stage of relevant knowledge and technology or the "state of the art", but sound building practices, coupled with preventative and remedial treatment presently available, can minimize or eliminate infestation.

After obtaining food, the workers usually return to the safer environment of their colony to feed and provide other services to the members of other castes. When the ground around a building is treated with toxic insecticides, most of the workers remaining in the building will be prevented by the chemical screen from returning to their colony and will ultimately die. The ones which succeed in returning to the colony will have contaminated themselves by travelling through the poisoned soil, and will ultimately die. They will also cause the death of the other members of the termite colony by spreading the contamination.

At present very little knowledge exists about the biology and behaviour of the particular species of termite as it occurs in Ontario and it is necessary to overcome the lack of knowledge through scientific research in order to subdue it.

3.2 Carpenter Ants - Description

Carpenter ants belong to several species of the genus Camponotus and are quite different from termites. They do not feed on wood but can damage it in structure by chewing their way through it, leaving small dust-like particles. They build galleries in wood, finishing and clearing the surface quite skillfilly and this is what has earned them their name.

Outdoors they feed on a wide variety of other insects and plants. They are attracted indoors by, and feed mostly on household food stuffs. They can travel considerable distances from their colonies in search of food.

The carpenter ant is among the largest of the common ants. In length the black or brown workers can range from 6 to 13 mm and the queen can be more than 25 mm. In the winter months they may go through a period of dormancy for several weeks in some colonies. In late spring or early summer the adults grow wings and swarm in mating flight which can result in starting most of the new infestations.

Outdoors they nest in stumps, hollow logs and fence posts, etc. In the buildings they can often have their nests in hollow doors and panelled spaces, window frames, behind baseboards, fireplaces, attics, basements and in damp spots such as behind washing machines or dishwashers. They normally excavate their nests in wood but they may nest in styrofoam, fibreglass and other insulation materials which have not been treated to prevent their attack.

Compared with termites carpenter ants can be controlled more easily and less expensively, both indoors and outdoors, by the use of residual insecticides injected into the nests or by removal of the wood containing the nest. Outdoors, the treatment may involve removal of old tree stumps, wood piles or fence posts, etc. As treatment lasts for a much shorter period compared with that for termites it has to be repeated subsequently if reinfestation occurs.

Good housekeeping and maintenance practices can keep the carpenter ants away, such as prevention of moisture through good ventilation and drainage, plugging of holes and cracks and other openings in the building, removal of decaying wood in and around the house, avoiding storage of fire wood for a long time, proper storage and regular removal of garbage, storage of food in closed containers, regular cleaning of any spills of syrup, sugar or other sweets and keeping kitchen counters, cupboards and shelves clean.

Of the total number of houses treated for infestation in Toronto, for the past 18 years, carpenter ants are estimated to account for only 5% compared with termites which accounted for 95%. However, for 1981 and 1982 carpenter ants accounted for 18% and 19% respectively; the great majority of these cases are accounted for by Wards 10 and 11 where infestation is exclusively related to carpenter ants.

3.3 Review of History of Termites in Toronto

The history of termites in North America predates by thousands of years the history of human settlement on this continent. Though they were first "discovered" in the U.S.A. in 1811, evidence in the form of fossilized remains supports the theory that termites were here long before humans.

In 1929 and again in 1931, the Eastern Subterranean Termites were found in Ontario, in small numbers and in their natural environment, near Point Pelee in Essex County. It is believed that the eastern subterranean termite, the predominant strain found in North America, came to Toronto from the U.S.A. between 1935 and 1938, most probably with a shipment of some infested material. In 1938 they were discovered in the vicinity of Cherry Street between the Keating Channel and Unwin Avenue on the shores of Toronto Bay (Map A).(1) It is possible they had existed here much before they were actually discovered.

Damage of economic significance caused by termites was discovered for the first time in the City in 1944. Localized but heavy infestations were recorded in eight areas of the south-eastern sections of the City, and isolated instances were noticed a few kilometres east, in Scarborough, in 1948-49 (Map A). Since then the problem has been steadily spreading.

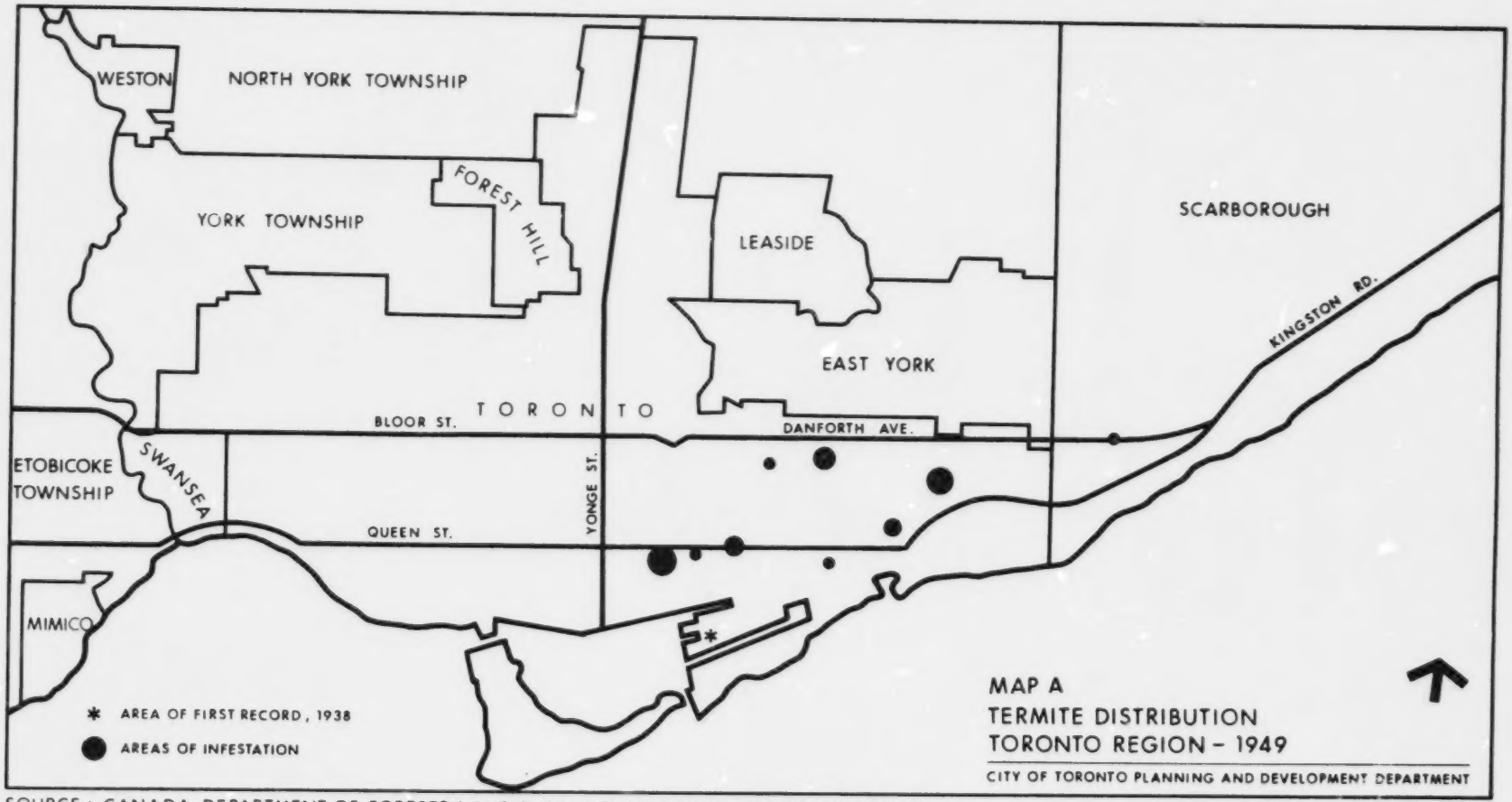
After an interval of four to five years, in 1952-53, areas which had already been identified as infested had grown larger but no other new infested areas were discovered. Areas west of Yonge Street and north of Danforth Avenue were still regarded as free of the problem.

By 1962, it was noticed that the initial isolated infested spots recorded earlier had now grown and joined to form several large areas of infestation. The areas of general infestation were no longer limited to the south-eastern areas of the City. Since any single infestation had the potential of spreading through a whole block, and other adjacent blocks, a single positive indication of termite presence was considered sufficient to label the whole block as "infested".

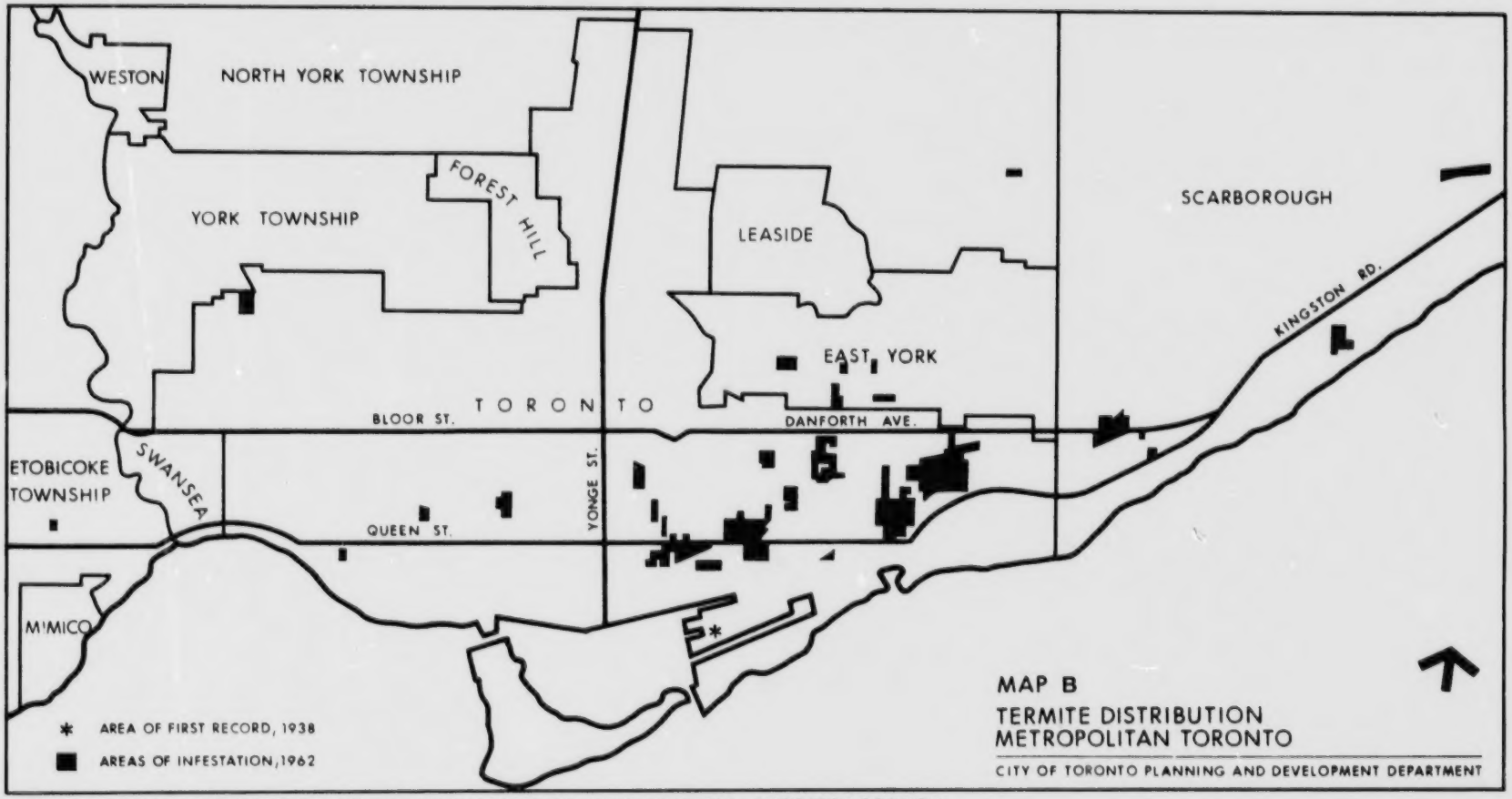
In Scarborough infestation by 1962 had intensified and appeared further east to a point about ten kilometres from the City boundary. The problem had also been recorded in other area municipalities. In the south-central section of East York several concentrations were recorded and North York and Etobicoke were no longer immune. Within 25 years (1938-1962) termite infestation had occurred over an east-west distance of about 30 kilometres across Metropolitan Toronto (Map B).

By 1964 infestation within the City limits had spread to 160 (out of 3,080) blocks, affecting both residential and non-residential properties. It seemed that infestation had leap-frogged westward across the City into Etobicoke. (Though what may have appeared as a sudden westward jump may be explained by infestation spreading undetected in the areas in question until it reached the stage when it became noticeable.)

By 1974, despite the City's Termite Control Program, over 200 City blocks and 1,401 structures had been identified as infested at one time or another (Map 1) (2).



SOURCE : CANADA DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT - FORESTRY BRANCH, INFORMATION REPORT 1963-1, APRIL 1963, "TERMITES IN ONTARIO WITH PARTICULAR REFERENCE TO THE TORONTO REGION".



SOURCE : CANADA DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT – FORESTRY BRANCH, INFORMATION REPORT 1963 – 1, APRIL 1963, "TERMITES IN ONTARIO WITH PARTICULAR REFERENCE TO THE TORONTO REGION"

By the end of 1982 infestation had been recorded in 446 blocks (Map 1). These included 67 blocks which had been recorded as infested earlier but in which no dwellings had been treated under the City's Termite Control Program between 1965 and 1982. Some of these 67 blocks were of a predominantly non-residential nature.

Between 1965 and 1982 3,378 homes were treated in 379 blocks (Map 2). The majority of owners of these homes received financial assistance under the Termite Control Program (Tables 5 and 6 and Figures 1, 2). The 95 houses in 78 blocks in the north end (in Wards 10 and 11) were treated exclusively for carpenter ant infestation. In other sections of the City 3,283 houses were treated; these were mainly for termites with an estimated figure of about 5% for carpenter ants. However, since non-residential properties are ineligible for financial assistance and therefore excluded, and since the homes of many owners who had them treated without City aid for reasons of privacy, etc. are also not included in these statistics, the actual number of properties and blocks subjected to infestation may well be substantially higher.

4. ORIGINS OF THE CITY'S TERMITE CONTROL PROGRAM

4.1 Recognition as a Community Problem

By early 1960's the City administration, as well as concerned east end homeowners had become well aware of the threat posed by termites and recognized it as a problem to be dealt with on the community level.

In March 1962 the City appointed, for the first time, a Termite Control Inspector in the Buildings Department; in July of that year it initiated an extensive program of inspections with a view to recording cases of termite infestation. From 1962 to 1965 over 4,000 residential and non-residential properties were inspected of which 901 were found to be infested. In 1965 the City's Termite Control Program was launched, and 67 dwellings were treated that first year (Table 5). In addition, other properties were being treated privately (of which no record is available) where the owners did not want or were not qualified for the City's grant.

TABLE 1

NUMBER OF PROPERTIES INSPECTED AND FOUND INFESTED, 1962-1965

Year	Inspected	Infestation confirmed	
		No.	%
1962	527	238	45
1963	1,299	218	17
1964	1,326	316	24
1965	1,232	129	10
	4,384	901	21

Source: City of Toronto Buildings Department, Annual Reports

Particular attention was focused on the heavily infested areas of the east end. In order to deal with the problem more effectively, building inspectors attended specially designed courses at the Ontario College of Agriculture and information packages were prepared for the many citizens who sought the City's help.

The City could only advise and encourage. It had no legal authority to compel property owners to take remedial or preventive action against termite infestation. Many owners were either unwilling or financially unable to undertake such measures, and by their inaction endangered the properties of their neighbours. The Householders Association for Termite Control urged City

Council to introduce improved measures for termite control as well as a system of grants and loans to homeowners to cover the cost of remedial and preventive work.

A survey by the Canada Department of Forestry, carried out with the co-operation of the City in 1963, documented and highlighted the spread of the termite problem in the Toronto Region (Map B).

4.2 Steps Towards Control Mechanism

4.2.1 Mandatory Treatment and Prevention - Legislation Adopted

In 1963 the City obtained enabling legislation from the Ontario government, giving it the authority to deal with the problem of termites and other wood destroying insects. This was the result of several years of study, and recommendations of a sub-committee of the Committee on Buildings and Development and the Committee on Public Welfare, Fire and Legislation. The legislation, enacted in the form of additional provisions in the Planning Act(3), empowered municipalities to pass by-laws to provide for:

(a) preventive and remedial measures in regard to both existing and new buildings; and

(b) financial assistance "not to exceed in any case $250 or not more than one-half of the cost".

On September 17, 1963 City Council passed By-law No. 21927 as an amendment to the Building By-law No. 9868, to provide for prevention of damage by termites or other wood destroying insects.(4) The precautionary measures in this By-law were aimed primarily at new buildings and new additions in which wood structural members were used. The By-law did not cover detached garages or frame sheds located more than 15 feet from any other building, or buildings in which no wood structural members were used, or buildings wherein all wooden parts had been treated in accordance with the Canadian Standards Association specifications for wood preservation. The provisions in the building by-law have since been superseded and replaced by those in the Ontario Building Code (Sections 7.2.2 and 7.2.3).

Another By-law, No. 22272 was passed about 13 months later on October 26, 1964.(5) This authorized the City to require:

(a) any buildings or structures, old or new, to be rendered termite resistant by treatment of soil;

(b) buildings damaged by termites (or other wood destroying insects) to be repaired;

(c) removal and destruction of wooden poles, trees, stumps and other wooden or cellulose material which is not part of a building and which has become infested; and

(d) to give a grant not exceeding $250 to or on behalf of the owner, as well as a loan to the owner of a residential building (as defined) towards the cost of repair of damage done by wood-destroying insects.

The provisions of grants and loans did not apply to the owner of a boarding or lodging house.

On June 20, 1973 the City enacted the current Termite Control By-law No. 189-73 (as amended), repealing By-law No. 22272. The new by-law still retained the main operative provisions of the original by-law, but clarified and extended them. The new by-law improved the definition of residential building, for the purpose of grants, to include "a building used solely for human habitation including any attached accessory use, or any building not exceeding three storeys in height containing at least one dwelling unit". The term "dwelling unit" was re-defined. The condition "occupied by owner" contained in the previous by-law was dropped. The owners of "residential buildings" as defined, which contained boarding or lodging houses, also became eligible for grants and loans.

Termite control grants have been given predominently to the owners of owner-occuped, tenant-occupied, and owner/tenant jointly occupied single residence type housing.

4.2.2 Grants to Homeowners

In 1964 the Province decided to join the fight against termites (and other wood destroying insects) by passing an Order-in-Council to subsidize the City's grant program. The subsidy was made available under a provision in the Ontario Housing Development Act which permits grants to be made for research purposes. Under this arrangement, the Ontario Housing Corporation provided a 50% subsidy up to a maximum of $125 towards the City's maximum of $250 for each dwelling treated under the Termite Control Program.

Though the by-laws were applicable throughout the City, the Board of Control instructed the Commissioner of Buildings to restrict the enforcement of mandatory requirements to a "pilot project" area. Although such an area was initially designated in the east end, grants were available City-wide to any owner of an infested dwelling. The program which in the early 1960s had begun as a termite inspection program without the powers of enforcement for preventive or remedial measures, had evolved by 1965 into a control mechanism with a legal backing including provisions of financial help to homeowners. In April 1965 the City started receiving applications for the first time for grants for soil

sterilization. Sixteen of the 67 houses treated that year were in the area of the "Pilot Project". As part of the Termite Control Program, homeowners within known areas of infestation were sent letters informing them about the problem, and about the financial assistance available from the City's Buildings Department.

From the beginning of the Program in 1965 to the end of 1974, soil treatment grants were given to a total of 805 homeowners (Table 5 and Figure 1). In August 1974 the administration of the Program was transferred from the Buildings Department to the then Development Department. Because of increased housing inspection activity and greater public awareness of the Program, the number of grants approved and the houses treated rose significantly, and by the end of 1975 a total of 1,015 homeowners had had their homes treated.

In the five year period 1971-75 there were 634 homes treated, more than double the 314 treated in the 1966-70 period. In the next five year period 1976-80, the figure rose to 1,707 (169% increase). By the end of 1982 the grants program had helped 3,378 homeowners, many of whom would have been unable to have their homes treated without such assistance.

As part of the 1979 inter-departmental reorganization, responsibility for the Termite Control Program passed to the Buildings and Inspections Department.

The cumulative number of City blocks where homes were treated grew from 25 in 1965 to 73 by 1970, to 132 by 1975, to 253 by 1980 and to 379 by 1982 (Table 6 and Figure 2).

The largest number of termite control grants were given in the east end of the City (84%), where the problem was the worst, followed by west end (6%) and the Central Area (5%) excluding 424 houses treated not under the termite control grants program but under the Kensington Neighbourhood Improvement Program (NIP). The north end, consisting of Wards 5, 10 and 11, accounted for 4.5% of the grants, out of which 3% related exclusively to carpenter ants.

The average cost of chemical treatment, which at the beginning of the program in 1965 was $191 per dwelling, increased to $300 for the period 1966-70 and again to $431 for the period 1971-1975. In 1976-1980, however, the average cost dropped to $407 (Tables 2 and 3). The cost sharing ratio remained constant until 1977 at 25% City, 25% provincial subsidy and 50% homeowner. The share of costs borne by the homeowner since then has averaged about 20%.

TABLE 2

AVERAGE COST OF CHEMICAL TREATMENT OF SOIL ONLY PER DWELLING BY PERIOD AND SOURCE OF FUNDS - 1965-1982

Period	Average Total Cost	Source of Contribution		
		City Grant	Provincial Grant	Homeowner
1965	$ 191	$ 47	$ 47	$ 97
	% 100	% 24	% 25	% 51
1966-70	$ 300	$ 72	$ 72	$ 156
	% 100	% 24	% 24	% 52
1971-1975	$ 431	$ 105	$ 105	$ 221
	% 100	% 25	% 24	% 51
1976-1980	$ 407	$ 97	$ 184	$ 126
Regular	% 100	% 24	% 48	% 31
1977-1978				
Kensington	$ 566	$ 283	$ 283	NIL
N.I.P.*	% 100	% 50	% 50	
1976-1980				
Regular +	$ 445	$ 142	$ 208	$ 95
Kensington NIP	% 100	% 32	% 47	% 21
1981	$ 513	$ 113	$ 291	$ 109
	% 100	% 22	% 57	% 21
1982	$ 539	$ 120	$ 310	$ 109
	% 100	% 22	% 58	% 20

* Kensington Neighbourhood Improvement Program. The entire cost not only of chemical treatment but of repair of damage by termites was paid for under NIP. Costs were shared - 25% by the City, 25% by the Provincial government and 50% by the Federal government.

The drop in cost for the period 1976-1980 can be attributed to greater efficiency resulting from the experience gained and adoption of improved skills and organization by the exterminators. Another significant factor could be the economy of scale as it was possible to treat an increasing number of houses in close proximity to one another or within the same neighbourhood.

In 1977 the 25% provincial subsidy (maximum $125) was replaced by much larger grants of 60% to a maximum of $2,000. As a result, the average provincial contribution rose to 45% in the 1976-1980 period, while the homeowner's share declined from more than 50% to 31%. In terms of money the average provincial contribution increased by 75% from $105 to $184, the City's contribution decreased by 8% from $105 to $97, and the homeowner's share decreased by 43% from $221 to $126. In 1981 and 1982 the average cost of chemical treatment increased to more than $500, the City and the homeowners share declined further and the provincial contribution rose close to 60% of the total cost.

Although, unlike the old provincial subsidy, the new provincial grants program does not cover the repair of termite damage and carpenter ant infestation, its more generous grants do cover the cost of more extensive chemical treatment of the soil and of wood/soil separation which was not possible before, and which many homeowners can not afford with their own resources. In the case of low income households, even the homeowner's share of the cost of repairs to termite damage could be included in the grants under the Ontario Home Renewal Program (provincial) or loans under the Residential Rehabilitation Assistance Program (federal) if the owners were qualified for such assistance.

Table 3 below gives the average cost of chemical treatment as well as wood/soil separation (introduced in 1977) for individual years from 1976 to 1982.

TABLE 3

AVERAGE COST OF CHEMICAL TREATMENT AND WOOD/SOIL SEPARATION PER DWELLING BY SOURCE OF FUNDS - 1976-1982*

Year	Work	Average Total Cost	Source of Contribution City Grant	Provincial Grant	Homeowner
1976	Chemical	$ 395	$ 101	$ 101	$ 192
	Wood/Soil	Nil	Nil	Nil	Nil
		% 100	25.5	25.5	49
1977	Chemical	$ 419	$ 97	$ 182	$ 140
	Wood/Soil	$ 1343		$ 760	$ 583
	Total	$ 1762	$ 97	$ 942	$ 723
		% 100	% 6	% 53	% 41
1978	Chemical	$ 397	$ 92	$ 196	$ 109
	Wood/Soil	$ 1297	$ --	$ 778	519
	Total	$ 1694	$ 92	$ 974	$ 628
		% 100	% 5	% 58	% 37
1979	Chemical	$ 401	$ 94	$ 209	$ 98
	Wood/Soil	$ 1895	--	$ 987	$ 908
	Total	$ 2296	$ 94	$1196	$1006
		% 100	% 4	% 52	% 44
1980	Chemical	$ 430	$ 100	$ 237	$ 93
	Wood/Soil	$ 1895	--	$1137	$ 758
	Total	$ 2325	$ 100	$1374	$ 851
		% 100	% 4	% 59	% 37
1981	Chemical	$ 513	$ 113	$ 291	$ 109
	Wood/Soil	$ 2145	--	$1040	$1105
	Total	$ 2658	$ 113	$1331	$1214
		% 100	% 4	% 50	% 46
1982	Chemical	$ 539	$ 120	$ 310	$ 109
	Wood/Soil	$ 2146	--	$1087	$1059
	Total	$ 2685	$ 120	$1397	$1168
		% 100	% 4	% 52	% 44

* Based on the number of dwellings subject to both chemical treatment and wood/soil separation work.

From 1977 the average ratio of City contribution to the cost of chemical treatment dropped down to 23%, the Provincial contribution increased and ranged from 43% in 1977 to 58% in 1982, and the homeowner's liability declined, ranging from a high of 33% in 1977 to a low of 28% in 1982.

The average cost of wood/soil separation rose from close to $1,300 in 1978 to about $1,900 in 1979-1980 and to more than $2,100 in 1981-1982. The average ratio of provincial contribution to the cost of wood/soil separation varied between 52% and 60%, from 1977 to 1980 and between 48% and 51% for 1981-1982 with the homeowner picking up the balance.

4.3 Kensington Neighbourhood Improvement Program

From 1976 to 1978 grants for chemical treatment equal to 100% of the cost, amounting to a total of more than $240,000, were given in the Kensington area to 424 homeowners throughout the area covered by the Neighbourhood Improvement Program (NIP). For the treatment to be effective it was intended to treat all structures, wood fences and trees on an entire block by block basis. Grants for wood/soil separation equal to 25% of the cost, up to a maximum of $2,000 per dwelling, were also approved where required. The grants were given not under the Termite Control Program but as redevelopment grants (under the Kensington Neighbourhood Improvement Program under the authority of Sub-section 8a of Section 22 of The Planning Act). As partners in N.I.P. the federal and provincial governments and the City contributed 50%, 25% and 25% respectively, towards the cost of the grants. It was noted that the prices quoted by the pest control operators in sealed tenders for treatment under NIP in the Kensington area were 39% higher than those for dwellings treated in 1977-78 in other areas of the City under the Termite Control Program ($566 compared with $407). Because of the entire block approach the treatment appeared to be more effective and only half a dozen cases of reinfestation have been reported up to now. They occurred mostly where wood-soil contact was not broken.

4.4 Program Review in 1975

Following a decade of operations of the Termite Control Program in Toronto, the City Development Department carried out a review in 1975. The purpose of the review was to provide a status report to serve as a basis for action and for improving further the effectiveness of the Program.

The 1975 Program Review report was submitted by the Commissioner of Development to the Executive Committee with six recommendations. In summary, these were:

(i) Authorize Commissioner of Development to examine in conjunction with the City Solicitor the Termite Control By-law for necessary amendments.

(ii) Request on behalf of City Council the Minister of the Environment to increase the maximum provincial contribution to the grant to be more compatible with the level of costs.

(iii) Include provision in the Termite Control By-law to require property owners and exterminators to report to the City all cases of infestation, suspected infestation and treatment.

(iv) Explore possibilities of funding from the Ministry of the Environment, for a staking program (placing of wood stakes which attract termites to feed on such stakes) for identification, assessment and monitoring of infestation.

(v) Amend Termite Control and Building By-law to increase the standard of protection against termites in new construction (i.e. pre-treatment of sites, more effective construction measures and use of materials).

(vi) Establish liaison and co-operation with the adjacent Boroughs.

Since 1975 the intent of some of the more significant of the foregoing recommendations, and other suggestions contained in the review, has already been achieved. But action or study is recommended in this report for increasing further the effectiveness of the termite control program.

5. THE CONTROL PROGRAM SINCE 1975

5.1 New Provincial Control Program (1977)

Following the 1975 Review the most significant development was the beginning of a more effective partnership between the City and the Provincial Ministry of the Environment. As a result of an agreement approved by City Council on April 21, 1977 the Province not only increased its financial contribution very substantially, but also assumed a more direct and active role in dealing with the problem of termites.(6) The new grants program is summarized in Table 4.

TABLE 4

SCHEDULE OF PROVINCIAL TERMITE CONTROL GRANTS BY THE MINISTRY OF THE ENVIRONMENT (1977 - PRESENT)

Eligible Recipients	Chemical Treatment and/or wood/soil Separation*		Grant for Chemical Pre-Treatment of Sites before Construction	
	% of Cost	Maximum Amount	% of Cost	Maximum Amount
1. Homeowner occupants	60%	$2,000	60%	$1,000
2. Tenants under lease obliged to remedy or prevent damage to the building	60%	$2,000	--	--
3. Owner occupants of mixed residential/ commercial buildings	60% of the cost multiplied by the fraction of the floor area used for residence by owner to a maximum of $2,000			

* The combined total maximum grant available for chemical treatment and wood/soil separation work cannot exceed $2,000.

The eligibility of cost of remedial and preventive measures was expanded significantly to include, besides chemical treatment, the work of breaking wood/soil contact. The work of wood/soil separation can be quite costly. For example, it can involve severing direct contact between the ground, wooden porches resting on the ground or in some instances the whole house with wood beams or plates resting on mud sills. Another significant new feature was the availability of grants for 60% of the cost to a maximum of $1,000 for pre-treatment (chemical) of dwelling sites prior to new construction, in the known infested areas. Earlier in 1976, the City had already approved the policy of advising applicants for building permits from infested areas to have their sites pre-treated. With more generous grants it would be possible to help greater numbers of homeowners who would otherwise be unwilling or unable because of financial difficulties to protect their homes.

Although the provincial program provided much larger benefits, it was more restrictive than the City's grants policy, and excluded:

(a) Repair of damage caused by termites - The reason given by the Province for exclusion was the continuation of the City's grant of up to $125 which could still partly cover the cost of repairs. It was also pointed out that assistance could possibly be available for repairs to those low income homeowners who qualified under the Ontario Home Renewal Program or the Residential Rehabilitation Assistance Program.

(b) Treatment Against Carpenter Ants - The Province argued that the small cost of treatment and the benefits to homeowners did not justify the additional administrative costs to the Province. It was pointed out that the cost involved was considerably less than the cost of termite treatment, and that a homeowner could even do the treatment himself at a smaller cost involving only the cost of chemicals. Furthermore, it was pointed out that the homeowner could continue to be eligible for and take advantage of the City grant.

(c) Treatment of Rooming Houses Excluded - Unlike the City, the Province regards even small boarding or rooming houses as commercial enterprises and did not include them in its grants program. However, the City continues to give its own grants to the owners of such buildings.

Other features of the new provincial program included:

(a) Licensing of Pest Control Operators and Exterminators - Coupled with its grants program the Province instituted a specific license for termite control. Under the Ontario Pesticides Act the pest control operators who hold this license can be required to report to the Ministry of the Environment all properties treated by them, including those outside the grants program. If the information obtained by

the Province is passed onto the City this reporting will improve the monitoring of infestation (Chapter 9, paragraph 3 and Appendix 1, paragraph 8).

(b) Staking Program and Visual Surveys - As part of the Termite Control Program the Ministry of the Environment instituted a staking program to determine termite activity. The program involved, placing of wood stakes which attract termites to feed on them. However, the Program was discontinued because of technical problems, and because the Ministry concluded that staking was no better than visual surveys. The Ministry passes on the results of its visual surveys to the relevant City officials.

More active involvement by the Ministry of the Environment in monitoring and control of infestation throughout Metrpolitan Toronto and south-western Ontario has now facilitated better co-operation and co-ordination of efforts between municipalities.

5.2 Government of Ontario Green Paper 1982

The most important development since the introduction in 1977 of the new termite control program was the release in November 1982 of a Green Paper by the Provincial Ministry of the Enviroment. "A Report on the Termite Control Program - A Green Paper" resulted from the work of an inter-ministerial committee which consisted of representatives from the Ministries of the Environment, Municipal Affairs and Housing, Consumer and Commercial Relations and Natural Resources. The Paper proposes significant changes to the existing program including reduction in the maximum provincial grant from $2,000 to $750 and raising of the municipal grant maximum from $125 to $500. Specifically, the Green Paper recommends that:

"A comprehensive and integrated termite control program be developed and implemented involving the programs and resouces of provincial ministries and municipalities, encompassing survey and monitoring, research, technical aspects, education, debris and soil disposal and an incentive grant.

Subordinate Recommendations:

1. The present program as administered by the Ministry of the Environment be continued until March 31, 1983 and the proposed program be phased into place and operative on April 1, 1983.

2. Surveys of the City of Toronto and Borough of East York be developed and financed by the Ministry of the Environment through consultants to determine the scope of termite infestations. these surveys to be implemented in

co-operation with the Ministry of Municipal Affairs and Housing, City of Toronto and Borough of East York.

3. A working committee be formed to develop the details and procedures for the proposed termite control program. The Committee would consist of members drawn from the Ministries of Environment, Municipal Affairs and Housing, Consumer and Commercial Relations, and Natural Resources, and incorporate municipal participation.

4. The grant incentive component of the program for residential properties include:

   (i) Provincial grants to a maximum of $750 for chemical treatment and the breaking of soil/wood contact.

      (a) For chemical treatment including pretreatment, 60% of costs to a maximum of $250.

      (b) For soil/wood contact work 30% of costs to a maximum of $500

   (ii) Replacement of the present provincial system of making payments directly to homeowners by making quarterly payments directly to the municipality based on completion certificates and payment receipts.

   (iii) Replacement of the present provincial system of committal, with funds paid to the municipality on proof of completed work.

   (iv) Conditions that provincial grants be available only to municipalities which: (a) develop a planned termite control program incorporating block treatment, (b) control the disposal of infested debris, (c) provide for the pretreatment of new construction in infested areas, (d) provide grants of not less than two-thirds of provincial grants and (e) base grants on the lower of two quotations.

5. The housing programs of the Ministry of Municipal Affairs and Housing incorporate recognition of the termite problem.

Financial Implications

Homeowner:

These recommendations will allow for the eligibility of more home occupants for assistance in control of termites. There

will be an increase in the home occupant's share of the cost in protecting their property.

Municipality:

Cost-sharing at 60/40 provincial/municipal will result in increased expenditures by municipalities in the Metro Toronto area. In other municipalities, where wood/soil contact work is not extensive, financial costs should be comparable to present costs. The decrease in the present administrative paper work of the municipality should offset the increase in municipal enforcement and inspection costs.

Ontario Government:

A lower provincial grant maximum of $750 will allow for grants to more home occupants to control termites for the same allocation."

While the basic recommendation can obviously be endorsed strongly some of the "Subordinate Recommendations" raise serious concerns.

(a) Phasing Out of Existing Program

In order to phase out the existing program by April 1, 1983, the Ministry of the Environment has been approving applications for grants as of September 1, 1982 upon the condition that all work must be ocmpleted by March 31, 1983. This condition is not feasible as much of the work required in wood/soil separation involves use of concrete in exposed areas which is impossible to do before the winter is over.

(b) Surveys

The proposed City-wide survey is likely to confirm rather than to add much to what is documented in this report, in regard to the growth and distribution of termites and the effectivenss of treatment. However, it will be useful to survey areas on a selective basis where, although no houses have been treated so far, but because of existence of soil or other conditions favourable to termites, infestation may be occuring undetected. Such a survey is being conducted by Dr. Richard V. Carr, the City's consulting entomologist.

(c) Working Committee

In view of the magnitude and seriousness of the termite problem in Toronto, the City should be a full member of the Committee rather than relagated to an indirect and minor role.

(d) Grant Incentive Component of the Program

(i) The proposed program will:

- Greatly reduce the maximum provincial grant:

  . for wood/soil separation and chemical treatment by $1,250 or 62.5%, and

  . for pretreatment (checmial treatment of sites before new construction) by $750 or 75%;

- Raise the City's maximum contribution from $125 to $500 or by 300%; and

- Reduce the maximum government financial assistance available to homeowners (including assistance for wood/soil separation) from $2,125 (City and provincial grant combined) to $1,250 or by 41% and will increase the homeowner's average share of total costs by up to 23% from about $1,200 to $1,500.

(ii) &
(iii) Provincial Funding Conditional Upon Policy of Block Treatment

The conditions outlined in 4(iv)(a)-(d)for the availability of provincial funds under the proposed program are already largely being met by the City with the exception of commitment to the policy of "block treatment". The condition is not clear. However, if the idea implies treatment of entire blocks within a particular area. what criteria will determine the priority for selection of particular areas or blocks? Will applications for grants from areas outside the selected blocks not be entertained?

In principle, the idea is commenable but its feasibility has to be considered in the light of available financial and treatment resources including the resouces of the pest control industry in terms of trained staff and equipment. In the City of Toronto more than 360 blocks containing about 22,000 houses have already been recorded as infested by termites. On the average each of those blocks contains 60 houses. At the present scale of provincial funding for the City and given the present resources of the pest control services, it will be possible to treat only seven or eight entire blocks annually, and at that rate it will take almost fifty years to treat the blocks which are already known to be infested, not to speak of dozens of newly infested blocks which are being discovered every year.

(e) Recognition of Termite Problem by the Ministry of Municipal Affairs and Housing

This recommendation, which implies recognition of the termite problem by the Ministry concerned for the purpose of assistance under its housing programs, is strongly endorsed.

5.3 City's Response to Green Paper

On March 7, 1983 City Council adopted the report dated February 18, 1983 from the Commissioner of Buildings and Inspections to the Neighbourhoods Committee and approved the following recommendations as the City's response to the Green Paper.

"Recommendation:

That the Province be requested to amend the proposed termite control program,

1. to extend the deadline for phasing out the existing termite control program to September 1, 1983 applicable, only to applications for approval received prior to March 31, 1983.

2. to include in the program provision for

   (a) surveys of selected areas adjoining areas known to have termite infestations rather than a municipal wide survey.

   (b) a survey and analysis of infested areas which have been extensively treated for termite control.

3. to include municipalities seriously affected by termite infestation as full contributing members on any proposed working committee.

4. to advance to the City $300,000.00 set up in an accounting manner similar to the Ontario Home Renewal Program. "Such funds to be used to offer termite sterilization to homeowners at no cost."

   (a) That the City discontinue its present policy of making grants for sterilization for termites or other wood destroying insects.

   (b) That homeowners be responsible for the breaking of any wood/soil contact only where it is deemed absolutely essential to maintain the effectiveness of the sterilization treatment.

5. That your Committee request City Council to adopt our report as a Position Paper, in response to the Ministry of the

Environment's Green Paper Report on the Termite Control Program."

5.4 Other Developments

(a) Attached Dwellings

A policy adopted by the City in 1977 of processing grant applications for treatment of attached dwellings only when all owners of such units had applied, had to be changed in 1978 on account of practical difficulties experienced in enforcing it. It was realized that it was unfair to hold up the processing of an application from an owner of an attached dwelling who was willing and anxious to proceed, on account of the one who was unwilling or unable to do so.

The revised policy permitted the processing of applications from willing owners even though their houses were attached to one or more units whose owners were not prepared to carry out treatment. When persuasion fails legal measures under the Termite Control By-law No. 189-73 could be sought against unwilling owners. In the past, however, the City has seldom resorted to such measures.

(b) Penalty

The penalty for contravention of provisions of the Termite Control By-law under Section 7 was raised from $1,000 to $2,000 (by an amending By-law No. 575-81, passed on September 10 1981).

(c) Relevant Official

The Termite Control By-law was further amended (by By-law No. 184-82) on March 11, 1982,designating not only the relevant official (i.e. Commissioner of Buildings and Inspections) but also his agents namely the Director of Inspections, the Director of Plan Examinations and the District Supervisors as inspector to enforce the provisions of the by-law. The change provides for more efficient enforcement of the By-law.

(d) Chemical Treatment of Soil Prior to Construction

The question of authority for requiring pretreatment of sites of new buildings in areas subject to termite infestation is dealt with in in Section 8.2 of this report. The City has already passed an amendment (By-law No. 488-82) on August 13, 1982 to the Termite Control By-law No. 189-73 which gives it the necessary authority.

(e) Revision of General Specifications

Under the authority of the Termite Control By-law, the Commissioner of Buildings and Inspections issues General Specifications (Appendix 2) to be observed by property owners and pest control operators in the performance of work to render premises resistant to termites. The City requires these specifications to be accepted in writing and followed as part of the agreement between the pest control operator and the owners, and for the owner's agent.

In order to help and protect the homewowner further, revisions have been made to the specifications. A letter of instruction (to the owner) is now included in the Kit of termite control literature. Also, minor revisions are being made in consultation with the Ministry of the Environment to the grant application form. The specifications have already been revised in regard to:

(i) requirements for the disposal of infested material;

(ii) requirements for basic equipment used by exterminators;

(iii) wording of warranty by the exterminator (pest control operators give a one year warranty as required by the City, renewable at annual fee basis of about 10% of the cost of initial cost of treatment); and

(iv) warning to homeowners against alterations to treated building components, material or ground.

The improved specifications have been in force from March 1, 1982.

(f) Replacement of Buildings

An amendment to Section 16(1) of the City's Zoning By-law No. 20623, will permit partial or total replacement of a building or structure in a legal non-conforming category, in the event of damage or destruction of such building or structure as a result of infestation by termites or other wood destroying insects.

(g) Consulting Entomologist

In view of the seriousness of the termite problem the City has retained, for one year commencing December 1, 1982, the services of a consulting entomologist - Dr. Richard V. Carr, with the following terms of reference:

- evaluate our present proceudres for identification of the problems and suppression methods used;

- analyse the results of current research throughout North America and apply the conclusions toward developing more effective methods of termite control for the City;

- submit interim reports and recommendations for procedure change; and

- after approximately a year's review, submit a final evaluation of the problems and recommendations for long term procedures for termite control in the City.

6. HOW THE PRESENT CONTROL PROGRAM WORKS

6.1 Inspection and Enforcement Mechanism

Besides providing for grants and loans to the owner/occupant of residential buildings, the Termite Control By-law (No. 189-73, Clause 2a) gives the City the authority to require the owners of any existing or new buildings, including buildings not eligible for grants or loans, to make their buildings resistant to termites or other wood-destroying insects. The By-law also authorizes the City to require, with reference to any property (not just residential), the removal and destruction of any wooden posts, trees, stumps or other wooden or cellulose material, which is not part of a building (Clause 3).

Action leading to inspection for termite infestation is initiated, in the majority of the cases, by the homeowners contacting the Buildings and Inspections Department. If an inspector is in the neighbourhood for termite inspection in response to a particular homeowner, the inspector, as a matter of departmental policy, also inspects other adjoining homes and if infestation is confirmed, he advises the occupants of the problem and about the assistance available for treatment.

The Buildings and Inspections Department recognizes that because of limited inspection staff it is not possible to enforce vigorously the termite control by-law against properties not eligible for provincial and City grants, or to undertake regular follow-up inspections of treated houses to assess the effectiveness of treatment.

6.2 Administrative Mechanism

If inspection confirms infestation the inspector also checks whether wood/soil spearation work is required, and leaves with the owner a set of papers popularly known as the Termite Control Kit. The Kit consists of:

1. By-law No. 189-73;

2. Application form for termite control grant (if infestation is by other wood destroying insects a different form is supplied);

3. (a) General Specifications - Termite Control, to be observed by the property owner and the pest control operator in the performance of work to render premises resistant to termites (Section 5.4(e) and Appendix 2); and

   (b) Declaration to the effect that the specifications form part of the agreement between the exterminator

and the owner, to be signed both by the owner and the exterminator;

4. List of Exterminators specially licensed by the Provincial Ministry of the Environment for termite sterilization; and

5. Ministry of the Environment Brochure "Termites Pest Control Information".

Having received the Termite Control Kit the homeowner submits the grant application to the Termite Control Officer for their area, along with bids from at least two exterminators for chemical treatment and, if wood/soil separation work is required, from two general contractors. The amount of the grant is determined on the basis of the lower of the two bids.

The Termite Control Officer scrutinizes the applications and the bids, and submits them to the Province. On receipt of provincial approval they are then submitted to City Council for approval.

Recognizing the fact that the administrative resources consisting of a single termite control officer and an assistant alone were inadequate, the operation of the program has been reassigned recently to three officers. In addition to termite control, the three officers are now also responsible for home renewal programs, i.e. the Ontario Home Renewal Program and Residential Rehabilitation Assistance Program in their respective area. Furthermore, the operation has been decentralizated and relocated from the City Hall to the three district offices for the North and Central, East and West districts of the City where the inspection staff is also located. Decentralization is expected to result in closer consideration between the inspection and adminstration staff and to speed up home renewal and termite inspections.

6.3 Need for Computerized Records for Purpose of Monitoring and Evaluation

The data presented in this report had to be processed manually, which was a very time consuming task.

This administrative review of the program strongly indicates the need for establishing and maintaining, in conjunction with the Planning and Development Department, and the Management Services Department, an appropriate computerized record keeping system. This would allow for regular and speedy:

(a) Mapping and monitoring of infestation;

(b) Analysis of progress of grant applications (broken down by termites and carpenter ants), i.e. receipt, inspection, treatment, etc.

(c) Computation of total cost of work including cost of wood/soil separation and chemical treatment, homeowner's share (of cost) and government grants;

(d) Analysis of allocation and expenditure of funds; and

(e) Inclusion of records for properties treated privately, i.e. outside the grants program.

7. REVIEW OF LEGISLATION

There is no federal or provincial legislation in Canada aimed solely or specifically at control or eradication of termites. The only province other than Ontario where termites are found is British Columbia. The B.C. termites are of the dampwood and western subterranean species. As British Columbia has suffered no significant damage to buildings by termites it does not have a control program similar to that of Ontario.(7)

7.1 Federal Legislation/Regulations

As the problem has not acquired a national dimension the federal government plays only a marginal role in matters related to termite control.

7.1.1 The Pest Control Products Act (1970)

This Act is administered by Agriculture Canada and regulates registration, handling and use of pesticides including chlordane and aldrin which are used in termite control.

7.1.2 The National Building Code of Canada

The Code is published by the National Research Council of Canada, through its associate committee on the NBCC. The code prescribes standards to ensure health and safety in buildings and includes provisions for making buildings resistant to termites. However, the Code itself is not enforceable unless local and provincial governments adopt and embody its provisions in their own codes or by-laws.

The Code provisions in general are now widely adopted as models for provincial building codes or municipal building by-laws throughout the country. All the NBCC requirements for termite resistant construction practices, found in Part 9, have been incorporated into the Ontario Building Code (see Section 7.2.3 of this report). They were also reflected largely in Section 25 of Chapter 7 of the City of Toronto Building By-law No. 300-68 which has since been superseded by the O.B.C.

7.1.3 CMHC Residential Standards

The Associate Committe on the NBCC is also responsible for issuing the residential standards used by the Canada Mortgage and Housing Corporation. These are based on Part 9 of the NBCC including provisions regarding termites and also on the additional requirements in the National Housing Act which regulates housing construction.

7.1.4 CMHC Minimum Property Standards for Existing Buildings

If termites are present or suspected to be present in existing buildings where these standards are applicable they must be exterminated and the buildings treated to prevent future infestation.

7.1.5 CMHC Standards for the Rehabilitation of Residential Buildings

These standards require "... where the presence of termites or pests is evident or suspected, appropriate measures for extermination and protection measures against future termite infestation shall be undertaken" (Clause 1.4 of the Standards).

The requirement applies to houses rehabilitated under the CMHC's Residential Rehabilitation Assistance Program (RRAP).

7.2 Provincial Legislation

7.2.1 The Housing Development Act 1960 as Amended

Until 1977 the Government of Ontario provided the City with a subsidy on the basis of 50% or $125 whichever was lesser per house, towards the cost of treatment of houses under the City's Termite Control Grants Program. The subsidy was given under the authority of Section 3 of the Housing Development Act which provides that:

> "3. The Minister may -
>
> (a) Make grants in aid of studies into housing conditions or any matter relating to housing in Ontario."

However, there are no specific provisions in the Act related to any aspect of the termite problem.

7.2.2 The Planning Act/The Municipal Act

The basic authority for municipal action with respect to termite control in Ontario comes from the enabling legislation passed by the province in 1963, in response to the City of Toronto's initiative. The provisions respecting protection from termites and other wood destroying insects were added to the existing provisions in the Planning Act regarding the right of municipalities to pass building by-laws(3). It was under this authority that the City of Toronto passed and enforced its by-law concerning termites and other wood destroying insects.

Following the proclamation in 1975 of the Ontario Building Code Act 1974, the provisions about building by-laws contained in the

Planning Act have become subject to the Building Code Act. At the same time the Ontario Building Code has superseded and replaced all municipal building by-laws.

Bill No. 159, 1982, passed in January 1982, which is an act to revise the Planning Act, deletes from the Planning Act certain powers of municipalities respecting building by-laws and related matters, including powers to pass by-laws concerning termite protection. At the same time Bill No. 194, 1982 (a companion bill to No. 159), transfers the provisions about control and cost of control of termites and other wood-destroying insects to Section 210 of the Municipal Act, paragraphs 173 and 174. Both these legislative amendments are to take effect from August 1, 1983. The intent of transferring the provisions about termites from the Planning Act to the Municipal Act is to let the provisions stand on their own in spite of and complementary to the Ontario Building Code Act and the Ontario Building Code.

At the same time certain provisions respecting termite control have been amended because of significant changes in the economic situation and increased costs since they were enacted in 1963. For example, the limit of $250 on payments to homeowners by municipalities for repairs or treatment has been removed and the condition of interest on loans "at a rate not exceeding 5%" has been changed to "at a rate to be determined by the Council (Section 46:23 of the present Planning Act; proposed paragraph 174, Section 210 of the Municipal Act).

7.2.3 The Ontario Building Code

At the end of 1974 the Ontario Legislature passed the Building Code Act, and it came into force in 1975. The Act provided the provincial government with the authority under Section 19 to make regulations "for the purpose of establishing a building code for Ontario governing standards for the construction and demolition of buildings".

The same year (1975) the Ontario Building Code was promulgated under Ontario Regulation No. 925-75, and remains in force as subsequently amended. Section 27 of the Building Code Act, 1974 made the then Section 38 (later Section 46) of the Planning Act subject to the Ontario Building Code Act, and the Ontario Building Code superseded all the municipal by-laws respecting construction and demolition of buildings.

The Ontario Building Code (OBC) contains at least eleven articles which require termite resistant construction practices in areas where termites are known to exist. There is no reference in the Code to carpenter ants. As the National Building Code of Canada (NBCC) has been used as the basis of the Provincial Building Code, six of the eleven articles of the OBC are identical to those of

the NBCC. The provisions are reproduced and cross-referenced in the chart which follows.

PROVISIONS IN THE ONTARIO BUILDING CODE AND THE NATIONAL BUILDING CODE OF CANADA (NBCC) RESPECTING PROTECTION AGAINST TERMITES

	Ontario Building Code		Reference to Corresponding Provisions in the NBCC
1.	9.3.3.7	Where wood is pressure treated with a chemical toxic to termites such treatment shall be in accordance with the requirements of one of the following standards, all as revised to May 1, 1975: CSA 080.1.1974. "Preservative Treatment of All Timber Products by Pressure Processes." CSA 080.2.1974, "Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes." CSA 080.9.1974 "Preservative Treatment of Plywood by Pressure Processes." or CSA 080.15.1974. "Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes."	9.3.3.7.
2.	9.7.2.4	Where termites are known to exist and where windows or other openings at or below grade contain wood elements, the bottom of window wells or adjacent ground shall be at least six inches below the nearest wood unless the wood is pressure treated with a chemical toxic to termites in accordance with Article 9.3.3.7.	No identical provision.
3.	9.8.9.1.	Exterior concrete stairs with more than two risers and two treads shall be supported on unit masonry or concrete walls or piers at least six inches by six inches or shall be cantilevered from the main foundation wall. When such concrete steps are cantilevered from the foundation wall, the main foundation wall shall be at least eight inches thick solid concrete and the depth below grade for foundations for exterior steps shall conform to the requirements in Section 9.12. Exterior wood steps shall not be in direct contact with the ground unless treated with wood preservative.	9.8.9.1.
4.	9.12.1.1.	(1) The top soil and vegetable matter in all unexcavated areas under a building shall be removed. (2) Where termites are known to exist, all stumps, roots and other wood debris shall be removed from the soil to a minimum depth of one foot in unexcavated areas under a building, and for an area extending two feet beyond the perimeter of the building.	9.12.1.1.
5.	9.12.3.4.	All wood scraps and forms shall be removed from around the foundations before backfilling and from under exterior steps or porches before construction is completed.	No identical provision
6.	9.15.5.1.	Foundation walls of hollow unit masonry supporting floor joists shall be capped with at least two inches of solid masonry or concrete, or have the top course voids filled with mortar or concrete, except that such capping may be omitted where termites are not known to exist when the wood joists are supported on a wood plate not less than two inches by four inches and the siding overlaps the foundation wall not less than half an inch.	9.15.5.1.
7.	9.16.9.1.	Where termites are known to exist, joints between slabs-on-ground and foundation walls, and spaces around pipes, conduit or ducts that penetrate such slabs shall be filled with bitumen-rubber compound or coal-tar.	9.16.9.1.
8.	9.17.4.4.	(1) Where termites are known to exist, exterior wood columns such as porch supports shall be, (a) pressure treated with a chemical that is toxic to such termites, in accordance with Article 9.3.3.7; or (b) supported on non-cellulosic material extending at least six inches above grade and located at least two inches from the exterior wall of an adjacent building.	No identical provision
9.	9.18.4.1.	The ground level in a crawl space shall be not less than twelve inches below the level of all joists and beams, except that where termites are known to exist, the clearance shall be not less than eighteen inches unless the joists are pressure treated with a chemical that is toxic to termites in accordance with Article 9.3.3.7.	9.18.4.1.
10.	9.23.1.6.	Preserved wood foundations shall conform to Sections 9.3, 9.13, 9.14 and 9.15.	No identical provision
11.	9.23.2.5.	Where termites are known to exist, unless pressure treated with a chemical that is toxic to such termites in accordance with Article 9.3.37., wood steps shall rest on a non-cellulosic base or apron extending at least six inches above grade, and wood lattice or skirting around porches shall be separated from piers and soil by at least two inches.	No identical provision

Five of the subject OBC articles (i.e. 9.7.2.4, 9.12.3.4, 9.17.4.4.(1), 9.23.1.6. and 9.23.2.5.) have no identically coresponding provisions in the NBCC.

Three of the articles (i.e. 9.8.9.1., 9.12.3.4. and 9.23.1.6.) are of a general nature and do not specifically refer to the termite problem but they may be generally regarded to provide for termite resistant measures.

Seven of the articles in question refer to the use of pressure treated wood or wood treated with preservatives (i.e. 9.3.3.7., 9.7.2.4., 9.8.9.1., 9.17.4.4.(1), 9.18.4.1., 9.23.1.6. and 9.23.2.5.). Only two of the corresponding NBCC articles (i.e. 9.3.3.7. and 9.8.9.1.) refer to the use of pressure treated wood or wood treated with preservatives.

7.2.4 The Pesticides Act

The Ontario Pesticides Act(8) and the Regulations issued under its authority deal basically with:

(a) Control of sale, purchase, transfer and use of pesticides and the practice of extermination;

(b) Examination and licensing of exterminators and pest control operations;

(c) Issuing of extermination permits;

(d) Cleaning and decontamination; and

(e) Other related matters.

However, Section 2 of the Act gives certain powers to the Minister of the Environment in regard to pesticides and the control of pests, which by definition include termites, as follows:

"2. The Minister, for the purpose of the administration of this Act and the regulations, may,

(a) investigate problems relating to pesticides and the control of pests;

(b) conduct research relating to pesticides and the control of pests;

(c) conduct studies of the effect of pesticides and the control of pests on the quality of the environment;

(d) convene conferences and conduct seminars and educational programs relating to pesticides and the control of pests;

(e) gather, publish and disseminate information relating to pesticides and the control of pests;

(f) make grants and loans for research related to pesticides and the control of pests in such amounts and upon such terms and conditions as the regulations may prescribe;

(g) appoint committees to perform such advisory functions as the Minister considers requisite;

(h) with the approval of the Lieutenant Governor in Council, enter into an agreement with any government or person relating to pesticides or the control of pests. R.S.O. 1980, c. 376, s. 2."

It is under the authority of clauses (f) and (h) that the Ministry of the Environment entered into the agreement in 1977 with the City of Toronto providing for payment of termite control grants.

7.3 City of Toronto By-laws

7.3.1 The Termite Control By-law No. 189-73

The text of the By-law is reproduced below for ready reference.

No. 189-73 A BY-LAW

As amended by By-laws Nos. 279-74, 123-77, 212-77, 786-78, 575-81, 184-82, 488-82

To provide for termite control

(Passed June 20, 1973)

The Council of the Corporation of the City of Toronto enacts as follows:

1. In this by-law:

(a) "residential building" means:

(i) a building used solely for human habitation including any attached accessory use, or

(ii) any building not exceeding three storeys in height containing at least one dwelling unit;

(b) "dwelling unit" means a suite of two or more rooms intended for domestic use and so used by one or more individuals and containing cooking, sleeping and sanitary facilities;

(c) "inspector" means a person designated by the Council of the Corporation to enforce the provisions of this by-law. (279-74) (786-78) (184-82)

2. (1) The person from time to time holding the office of Commissioner of Buildings and Inspections of the Corporation is hereby designated as an inspector to enforce the provisions of this by-law.

(2) The person from time to time holding the office of Director of Inspections is hereby designated as an inspector to enforce the provisions of this by-law.

(3) The person from time to time holding the office of Director of Plan Examination is hereby designated as an inspector to enforce the provisions of this by-law.

(4) The persons from time to time holding the office of District Supervisor - Buildings and Inspections are hereby designated as inspectors to enforce the provisions of this by-law (184-82).

2a. An inspector may give to the owner of any building or structure heretofore or hereafter erected notice in writing requiring that the building or structure be made resistant to termites or other wood-destroying insects by poisoning of the soil adjacent thereto by a licensed pest or termite exterminator in such manner and by such means as is specified in the notice, or requiring that the building or structure be made resistant to termites or other wood-destroying insects by any other means specified in the notice, and upon receipt of such notice the owner shall forthwith carry out the requirement thereof. (786-78) (184-82)

2b. No person shall erect a building in which wood structural members are used, unless the soil below the foundations and the lowest floor of the building and the soil adjacent to the foundation walls and supporting piers is first impregnated with a chemical toxic to termites in such a manner that there is no subgrade access to the building structure except through such chemically treated soil." (488-82)

3. Where any wooden pole, tree, stump or other wooden or celulose material not being part of a building has become infested with termites or other wood-destroying insects an inspector may give to the owner of such pole, tree, stump or other material notice in writing certifying that such infestation exists and requiring that the said pole, tree, stump or other material be removed and destroyed, and upon receipt of such notice the owner shall forthwith carry out the requirements thereof. (184-82)

4. The Corporation, may, upon application made to it for that purpose, pay to or on behalf of the owner of a residential building a portion of the cost incurred hereafter by such owner in repairing damage done to such residential building by termites or other wood-destroying insects and/or of rendering any residential building heretofore erected resistant to termites or such other insects, such portion being an amount fixed by the Corporation, not exceeding one quarter of the said cost or $125 whichever is the lesser. (212-77)

5. The Corporation may, upon application made to it for that purpose, loan to an owner of a residential building for purposes of being applied to the cost incurred hereafter by such owner in repairing damage done to such residential building by termites or other wood-destroying insects and/or of rendering any residential building heretofore erected resistant to termites or such other insects, such portion being an amount fixed by the Corporation not exceeding the actual cost of such work less any amount paid by the Corporation in respect thereof under section 4.

6. When an owner intends to make an application pursuant to sections 4 and 5 or either of them he shall do so by delivering the same to an inspector and before the carrying out of the work of repairing damage to the residential building by termites or other wood-destroying insects or of rendering the same resistant thereto, the Commissioner shall report thereon with his recommendation to the Council, and the Council may in its discretion grant or refuse any such application or may grant the same subject to such terms and conditions as the Council may prescribe. (184-82)

7. Every person who contravenes any of the provisions of this by-law shall, upon conviction thereof, forfeit and pay penalties not exceeding (exclusive of costs) the sum of Two Thousand Dollars ($2,000) for each offence. (123-77) (575-81)

8. By-law No. 22272 being "A By-law Respecting Termites" is hereby repealed.

7.3.2 Maintenance and Occupancy Standards By-laws

Though the City's Housing (Standards) By-law No. 73-68, as amended, and the Non-Residential Standards By-law No. 376-73 are aimed basically at maintenance of properties which are not in good repair they can be helpful in preventing termite infestation. They require prevention of entry of rodents, insects (including termites) and vermin through cracks or holes, prevention of moisture; adequate ventilation and drainage and prevention of deterioration due to weather and insects. The authority for the By-laws comes from the City of Toronto Act, 1936 (Section 6) as amended and the City of Toronto Act, 1971 (Section 11) as amended.

8. REVIEW OF ISSUES CONCERNING LEGISLATION

8.1 Certification for Removal of Infested Material

Section 46:22(c) of the Planning Act (replaced by Section 210:173(iii) of the Municipal Act) gives municipalities the power to remove "any wooden pole, tree, stump or other wooden or cellulose material not being part of a building" on the condition "if they are certified by the building inspector or commissioner to be infested". The problem with such a requirement is that the enforcement officers find it difficult to certify "infestation" without thorough examination, which in many cases results in damaging the wooden members. Certification of infestation is even more difficult in cases where buildings have been or are being renovated and include new landscaping features such as wooden fences, retaining walls, wooden decks supported by wooden posts embeded in the soil or high board fences supported by wooden posts, etc. The officials concerned feel that the conditions for certification should be amended so as to reflect a potential risk of infestation rather than a definitive statement of existent infestation. The matter is already under discussion with the relevant provincial officials and is expected to be resolved satisfactorily.

8.2 Authority for Requiring Chemical Pretreatment

In 1979 the City had under consideration passing of a by-law that would authorize it to require chemical pretreatment of soil on building sites before construction of new buildings in areas where termites were known to be active.

In the opinion of the City Solicitor the authority under Subsection 22 of the then Section 38 (later Section 46) of the Planning Act did not extend so as to grant power to a municipality to pass such a by-law. The City Solicitor also pointed out the fact of supersession of all municipal by-laws respecting construction and demolition by the Ontario Building Act 1974 and the Ontario Building Code. He also cited a decision of the Divisional Court in the case of Minto Construction Limited and the Township of Gloucester. In that case the court held that the Building Code was the exclusive vehicle for the regulation of building construction and that municipal by-laws, past or future, that purported to govern the matter of building construction were of no effect.

In the light of the foregoing legal situation it was thought that the authority for pre-treatment should be sought from the province in the form of amendment to the Building Code Act and the Ontario Building Code. The matter was referred to Hon. Frank Drea, then the Minister responsible for the Ontario Building Code. He responded by saying that while he acknowledged and respected the City Solicitor's interpretation as possible, it appeared to him

that the practice of requiring soil pre-treatment for termites was being carried on by other Ontario municipalities on the basis of the existing authority under the Planning Act. The Minister said that in his view it did not seem necessary to amend the Building Code Act or the Ontario Building Code and that it was open to the City of Toronto to require pre-treatment under the existing Planning Act.

In the light of the Minister's view the City Solicitor advised that the City Council could enact a pre-treatment by-law under the authority of the Planning Act (Section 46:22) and let the question of its legality be determined by the courts. In the event that the by-law was held invalid a new request for amending legislation could be made. Based on this, an amendment (in the form of By-law No. 488-82) to the Termite Control By-law No. 189-73 was passed by City Council on August 13 ,1982. This amendment has added a new Section:

"2b No person shall erect a building in which wood structural members are used, unless the soil below the foundations and the lowest floor of the building and the soil adjacent to the foundation walls and supporting piers is first impregnated with a chemical toxic to termites in such a manner that there is no subgrade access to the building structure except through such chemically treated soil." (488-82)

8.3 The Matter of Wood/Soil Contact and the OBC

In areas where termites are known to exist five of the OBC articles prohibit wood/soil contact or require adequate clearance between the ground and wood members of a building, if untreated wood is used, in regard to the following:

(a) windows at or below grade (9.7.2.4.)

(b) exterior wood steps (9.8.9.1.)

(c) exterior wood columns such as post support (9.17.4.4.(1))

(d) joists and beams in a crawl space by requiring at least 18 inch clearance above the ground level (9.18.4.1.)

(e) wood steps and wood lattice skirting around porches (9.23.2.5.)

However, the prohibition does not apply and wood/soil contact is permitted or the clearance reduced, if wood which has been pressure-treated in accordance with article 9.3.3.7. (CSA Standards 080.1) or treated with wood preservative (9.8.9.1.) is used. The OBC also permits the use of preserved wood foundations in direct contact with soil if it conforms with the requirements of Sections 9.3, 9.13 and 9.14 (9.23.1.6.).

The provisions in the City of Toronto Building by-law No. 300-68 (Chapter 7, Section 25(2)), which now stands superseded by the OBC, also did not require wood/soil separation if pressure-treated wood was used.

The wood/soil contact permitted by the OBC when treated wood is used has been a matter of concern to the officials of Toronto's Buildings and Inspections Department who administer the termite control program.

The CSA standards for treatment of wood require, among other things:

> "All cutting, such as adzing, boring, chamfering, gaining, surfacing, treating, etc. shall be done prior to treatment. In the event that cutting becomes absolutely necessary after treatment, the cut surfaces shall be treated in accordance with CSA standard 080-M4. Standard for the care of Pressure Treated Wood Products (CSA 080.1-2.5 Maching)."

Treated wood used in buildings comes to the market in standard nominal sizes, such as 2" x 4", 2" x 6", 2" x 8", 4" x 4", etc. and in 8', 12' or 16' lengths. When the treated wood is used in actual practice, in most cases it is altered by being cut to the required length, drilled, nailed and bolted, etc. As in actual practice, in most cases the end cuts, etc. are not re-treated it no longer remains termite resistant or meets the CSA standards. Even if the wood is not altered before use, the chemical seal in many varities of wood penetrates no deeper than six milimetres, and can be broken easily through rough handling, bruising or splintering, making it vulnerable to termites.

In the opinion of the Buildings and Inspections Department it is almost impossible to police the treatment of end cuts, bruises and splintering. Because of this practical difficulty, use of pressure treated wood is probably not an effective safeguard against termites.

8.4 Further Comments on the OBC

- Article 9.1.2.1.1.(2): The requirement of removal of stumps, roots and wood debris should not be limited to an area extending two feet beyond the perimeter of the building but should cover the entire area of the property. Any wood left in the ground anywhere on the site will support a termite colony.

- Article 9.16.9.1.: Sealing with bitumin, rubber compound or coaltar of joints between ground slabs and foundation walls and spaces around conduits, etc. may not provide lasting protection against termites. In time the seal is likely to crack or shrink making termite entry possible.

As an added protection, appropriate chemical treatment of exterior soil adjacent to joists, etc. should be required.

- Article 9.18.4.1.: A crawl space of 12 inches below the joists (even if the joists are pressure treated), permitted under this article hardly allows a worker sufficient space to crawl through it for any repair, servicing of utilities or other purpose.

- Article 9.23.1.6.: In view of limitations of treated wood (as pointed out earlier) it is considered risky to permit preserved wood foundations in any areas in the south-central or south-western Ontario where termites are known to exist.

Issues and concerns about the OBC provisions vis-a-vis protection against termites have from time to time been brought to the notice of the Ministry of Consumer and Commercial Relations (which administered the OBC) by the City of Toronto. It is important from the City's point of view that the issues raised here, most particularly that of permitting the use of treated wood, should now be resolved.

8.5 Termite Control By-law No. 189-73

A number of issues were raised, mostly at the time of the earlier review of the Termite Control Program in 1975. It was thought that the resolution of most of these might require amendments to the By-law.

Since 1975 certain amendments have already been made (Section 5.4), and revisions have been made to general specifications for termite control (Section 5.4.(b), (c), (d) and (e) of this report). The remaining issues were concerned with:

(a) Definition of the terms "building or structure" as they appear in Sections 2a, 2b and 3 of the By-law;

(b) Extension of By-law to "structures" such as wood fences, wood sundecks and wood landscaping features such as retaining walls and flower boxes, etc. not regulated either by the Ontario Building Code or the City's Housing and Non-Residential Standards By-laws;

(c) Definition of owner so as to include owner as well as the owner's agent for purpose of notice and enforcement;

(d) Authority for entry and inspection;

(e) Authority for regulations or specifications;

(f) Inclusion of specifications in the By-law of terms and conditions of loans (under Section 5 of the By-law);

(g) Certification of satisfactory completion of work by pest control operators, etc.

(h) Mandatory reporting of known, suspected and treated cases of termite infestation by property owners and pest control operators (in properties not covered by grants and loan provisions); and

(i) Mandatory inspection and certification for termite infestation at the time of transfer of ownership of property.

The foregoing issues were analyzed during this study, in conjunction with the City Solicitor, to determine the appropriate course of action for resolving these with a view to improving the effectivess of the control program and for better monitoring and prevention of infestation in the City.

The analysis presented in Appendix 1 demonstrates that most of the objectives underlying the issues can be achieved, through the powers which the City already has under the enabling legislation, the By-law or other statutes, without any significant amendments to the By-law at this stage. The two major concerns about monitoring and prevention of infestation can be met by the improved administrative and public information measures recommended in this report.

9. GROWTH AND INTENSITY OF THE TERMITE PROBLEM

Unlike the provincial government policy, the City's component of the termite control program covers infestation by all wood destroying insects including carpenter ants. The overall statistics therefore include cases of carpenter ant infestation. In the case of Wards 10 and 11, it is known that all the houses treated are accounted for by carpenter ant infestation. For all other areas no separate statistical breakdown is available for the past 18 years of operation of the program. However, the Buildings and Inspections Department believes the number to be small, about 5% in all areas except Wards 10 and 11. For 1981 and 1982 houses treated for carpemter ants in the City accounted for 18% and 19% respectively and half of these were in Wards 10 and 11.

The statistics used in this study are based on the number of houses treated (including the ones treated against carpenter ants) under the grants program, and on the number of residential blocks in which those houses were located. The statistics and maps do reflect a very significant growth in the termite problem in the City.

No Data on Properties treated privately.

The data in this report do not reflect the full extent of the City's termite problem. For example, it is not possible to document cases not eligible for termite control grants but treated privately. Data on private treatment is maintained by the Province but, in the past because of the way it is stored, has not been made available to City officials.(9)

By 1974, 1,401 properties, including non-residential, had been recorded as infested (Section 3.3); of these, only 805 houses were subsequently treated under the grants program (Table 5).

Similarly in addition to 379 blocks(10) in which houses were treated between 1965 and 1982 termite and carpenter ant infestation had been recorded in another 67 City blocks before 1965 where no houses have so far been treated under the termite control grants program (Table 6).

Termite infestation has been growing in Toronto for a long time, but its spread and intensity generally remains unrecognized until cases happen to be detected and treated under the grants program. There has been a progressive increase in such cases over time as documented by the data presented in this study. The treatment data do not reflect per se the spread of termite infestation which may proceed ahead of detection and treatment but they are the only available indicators of the growth of the problem. The increasing number from one period to another reflect increased inspection and treatment activities as well as the more generous grants made

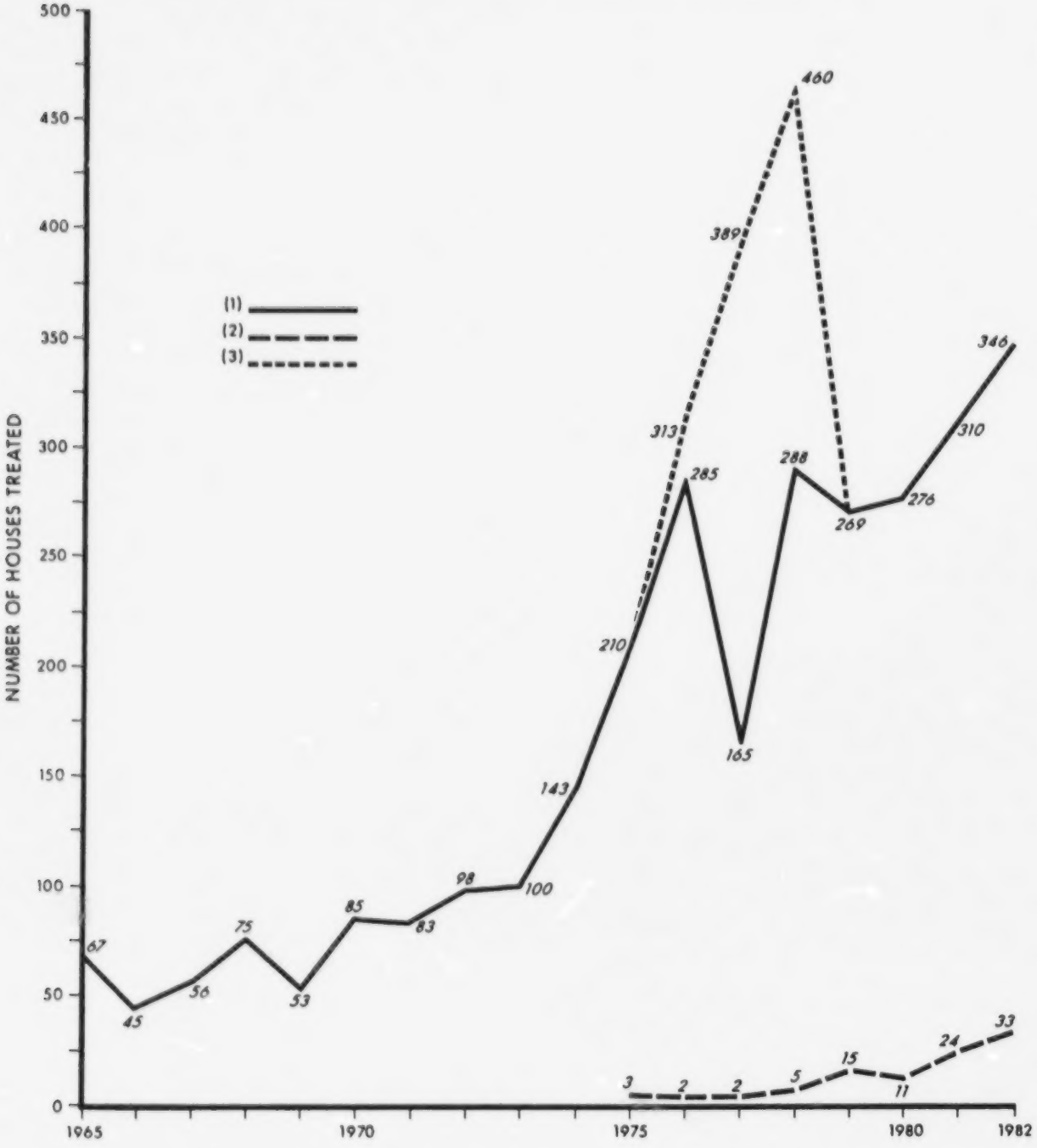
available from about the end of 1977 and also greater awareness of the problem by homeowners.

9.1 Historical Growth

Figures 1 and 2, Tables 5 and 6 and Map 1 reflect the growth of houses treated for termites and carpenter ants between 1965 and 1982.

FIGURE 1

GROWTH OF INFESTATION BASED ON THE NUMBER OF HOUSES TREATED FOR TERMITES (AND CARPENTER ANTS) BETWEEN 1965 AND 1982



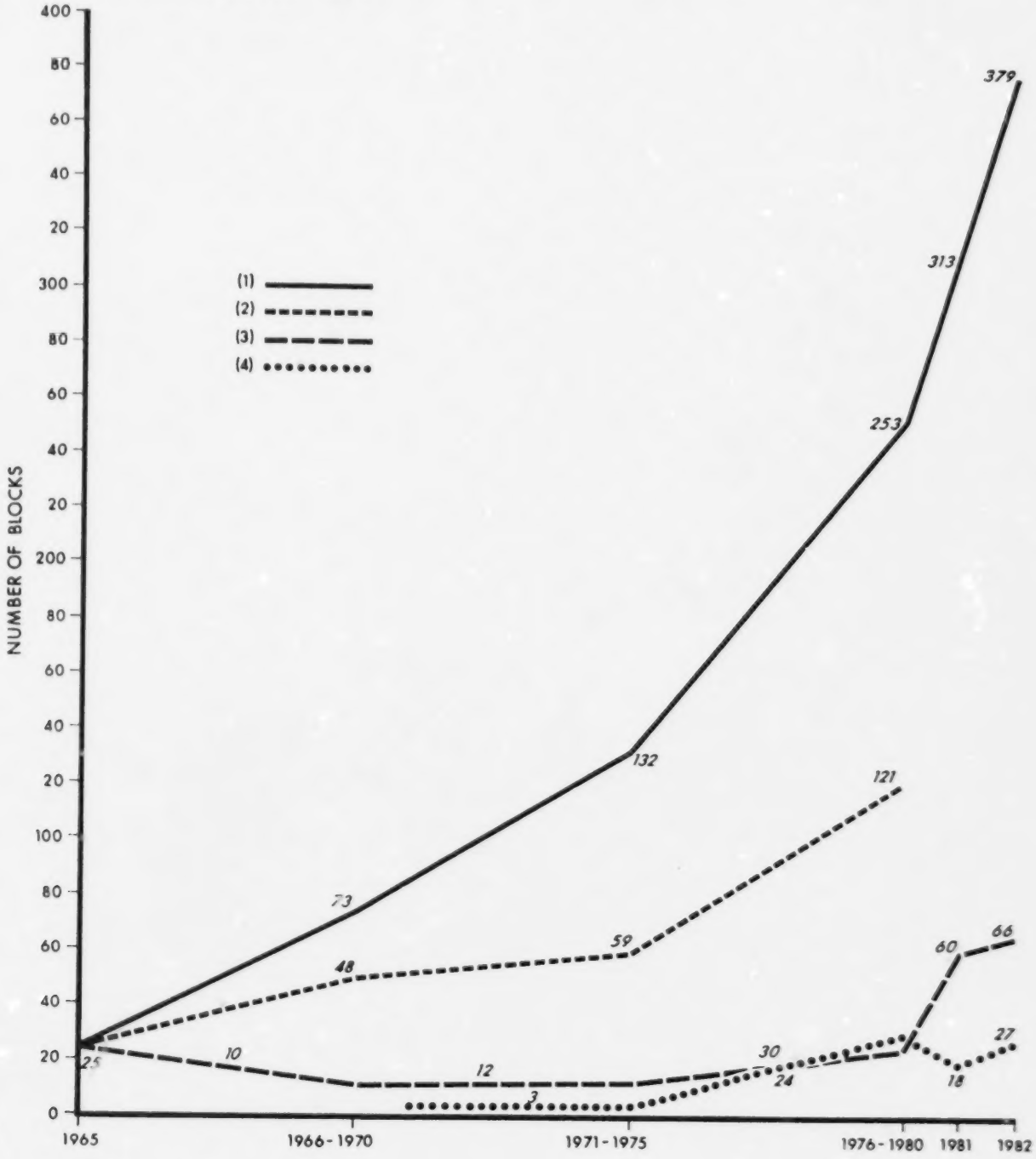
(1) TOTAL NUMBER OF HOUSES TREATED UNDER THE TERMITE CONTROL GRANTS PROGRAM (INCLUDING THOSE FOR CARPENTER ANTS)

(2) HOUSES TREATED EXCLUSIVELY FOR CARPENTER ANTS IN WARDS 10 AND 11 (INCLUDED IN (1)

(3) TOTAL NUMBER OF HOUSES TREATED UNDER THE TERMITE CONTROL GRANTS PROGRAM PLUS HOUSES TREATED UNDER THE KENSINGTON NEIGHBOURHOOD IMPROVEMENT PROGRAM, BETWEEN 1976 AND 1978

FIGURE 2

GROWTH OF CITY BLOCKS SUBJECT TO TREATMENT OF ONE OR MORE HOUSES FOR TERMITE (AND CARPENTER ANT) INFESTATION BETWEEN 1965 AND 1982



(1) CUMULATIVE NUMBER OF BLOCKS TREATED BETWEEN 1965 AND 1982

(2) TOTAL NUMBER OF BLOCKS TREATED BY (FIVE YEAR) PERIODS

(3) AVERAGE NUMBER OF BLOCKS BY (FIVE YEAR) PERIODS UP TO 1980 AND ACTUAL NUMBER OF BLOCKS FOR 1981 AND 1982 TREATED ANNUALLY

(4) NUMBER OF BLOCKS TREATED FOR CARPENTER ANTS EXCLUSIVELY IN WARDS 10 AND 11 (INCLUDED IN TOTALS FOR (1) AND (2)) BY PERIODS

NOTE: ALSO SEE TABLE 6

TABLE 5 - NUMBER OF HOUSES TREATED BY AREA AND WARD, 1965 TO 1982

I - Termites and Carpenter Ants

Areas & Ward #		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Total
West	1																1	1	2	4
	2		2												4	1				9
	3										1								1	2
	4		2				1	3		5	5	3	13	1	7	34	25	32	47	176
Sub-total			2				1	3		5	6	3	13	1	13	35	26	33	50	191
Five Year Sub-total					(3)					(17)					(88)					
Central Kensington NIP*	6												28	224	172					424
Rest of Central Area			2	1	1	4	1	5	4	2	7	24	29	4	8	6	6	9	32	145
Sub-total			2	1	1	4	1	5	4	2	7	24	57	228	180	6	6	9	32	569
Five Year Sub-total					(9)					(42)					(477)					
East	7	1	10	8	13	15	14	18	17	32	52	86	109	68	113	91	118	88	70	923
	8	54	27	35	50	28	53	32	56	46	51	63	80	48	83	74	74	65	66	985
	9	12	4	12	11	6	16	25	21	15	26	31	50	42	64	47	36	82	78	578
Sub-total		67	41	55	74	49	83	75	94	93	129	180	239	158	260	212	228	235	214	2486
Five Year Sub-total					(302)					(571)					(1097)					
North	5										1		2		2	1	5	9	17	37
Five Year Sub-total										(1)					(10)					
Toronto Carpenter Ants and Termites		67	45	56	75	53	85	83	98	100	143	207	311	387	455	254	265	286	313	3283
Five Year Sub-total					(314)					(631)					(1672)					

II - For Carpenter Ants Exclusively in Wards 10 and 11

North End	10											1	1	2	2	7	3	12	12	40
	11		2									2	1		3	8	8	12	21	55
Sub-total												3	2	2	5	15	11	24	33	95
Five Year Sub-Total										(3)						(35)				
Grand Total		67	45	56	75	53	85	83	98	100	143	210	313	389	460	269	276	310	346	3378
					(314)					(634)					(1707)			310	346	3378

* Houses treated not under the regular Termite Control Grants Program but under the Neighbourhood Improvement Program for Kensington Area

TABLE 6

DISTRIBUTION OF BLOCKS SUBJECT TO INFESTATION AND TREATMENT BY PERIOD

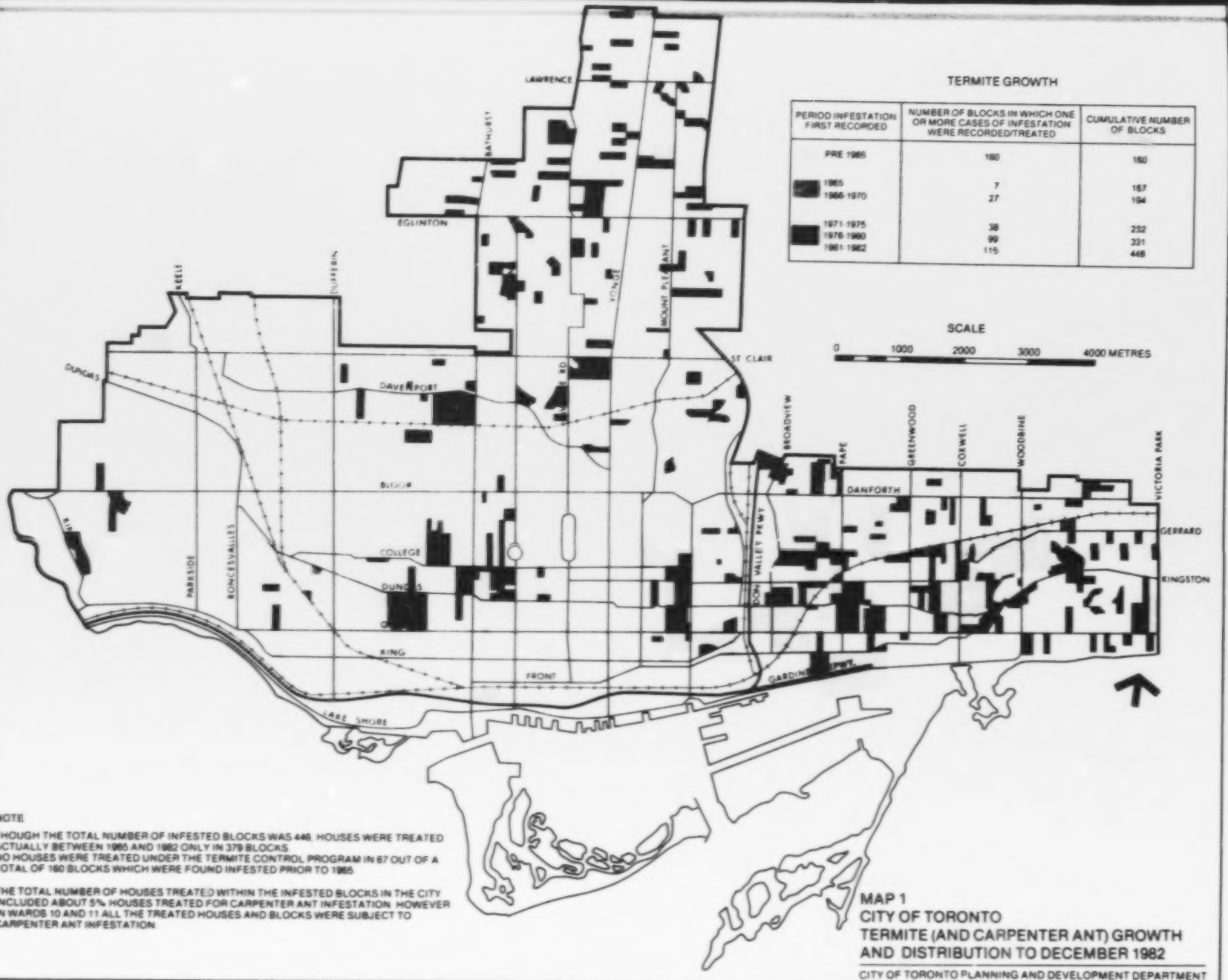
I - TERMITES AND CARPENTER ANTS

Period of Treatment	Number of Blocks Subject to Termite Control Grants Program			
	Recorded As Infested Prior to, but Treated Since 1965	Infestation Detected & Treated Since 1965	Total Blocks Treated	Accumulated Number of Infested Blocks
1965	18	7	25	25
1966-70	21	27	48	73
1971-75	21	35	56	129
1976-80	21	70	91	220
1981	6	36	42	262
1982	4	35	39	301
Total Treated	91*	210	301	301
Blocks recorded infested prior to 1965 but not yet treated under Termite Control Grants Program				61*
Total blocks subject to termite and carpenter ant infestation				362

II - CARPENTER ANTS EXCLUSIVELY IN WARDS 10 AND 11

Period of Treatment	Number of Blocks Subject to Termite Control Grants Program				
	Recorded As Infested Prior to, but Treated Since 1965	Infestation Detected & Treated Since 1965	Total Blocks Treated	Accumulated Number of Infested Blocks	Combined Accumulated No. of Blocks Under I and II
1965					25
1966-70					73
1971-75		3	3	3	132
1976-80	1	29	30	33	253
1981		18	18	51	313
1982	1	26	27	78	379
Total Treated	2*	76	78	78	379
Blocks recorded infested prior to 1965 but not yet treated under Termite Control Grants Program				6*	67
Total blocks subject to carpenter ant infestation exclusively				84	446

* The total number of blocks identified as infested prior to 1965 was 160. They were identified in connection with the study carried out by Mr. Colin A. Hughes in 1974.



TERMITE GROWTH

PERIOD INFESTATION FIRST RECORDED	NUMBER OF BLOCKS IN WHICH ONE OR MORE CASES OF INFESTATION WERE RECORDED/TREATED	CUMULATIVE NUMBER OF BLOCKS
PRE 1965	160	160
1965	7	167
1966-1970	27	194
1971-1975	38	232
1976-1980	99	331
1981-1982	115	446

SCALE

0 1000 2000 3000 4000 METRES

NOTE

THOUGH THE TOTAL NUMBER OF INFESTED BLOCKS WAS 446, HOUSES WERE TREATED ACTUALLY BETWEEN 1965 AND 1982 ONLY IN 379 BLOCKS.
NO HOUSES WERE TREATED UNDER THE TERMITE CONTROL PROGRAM IN 67 OUT OF A TOTAL OF 160 BLOCKS WHICH WERE FOUND INFESTED PRIOR TO 1965.

THE TOTAL NUMBER OF HOUSES TREATED WITHIN THE INFESTED BLOCKS IN THE CITY INCLUDED ABOUT 5% HOUSES TREATED FOR CARPENTER ANT INFESTATION. HOWEVER IN WARDS 10 AND 11 ALL THE TREATED HOUSES AND BLOCKS WERE SUBJECT TO CARPENTER ANT INFESTATION.

MAP 1
CITY OF TORONTO
TERMITE (AND CARPENTER ANT) GROWTH AND DISTRIBUTION TO DECEMBER 1982

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT

The data used for analysis and presented in this report were collected and tabulated for the period 1965-1982.The 1982 statistics are based on the grants approved by City Council up to the beginning of October (it is assumed that the houses in question would have been treated by the end of the year).

Discounting 95 cases treated solely for carpenter ants in Wards 10 and 11, and another 5% in mixed areas, more than 3,000 homes are estimated to have been treated for termite infestation in 301 City blocks. In addition, there are 61 blocks which were recorded as infested before the introduction of the Termite Control Program in 1965 and which brings up the total number of blocks subject to termite infestation to 362, or 15% of all the residential blocks in the City. The infested blocks contain about 22,000 single family homes of which about 19,000 remain untreated.

As the known chemical treatment largely provides a protective barrier against termite attack rather than destroying them totally in their colonies, they continue to move to the next accessible source of food. The analysis in Table 7 indicates that once infestation occurs in a neighbourhood, it tends to persist and spread despite treatment of individual properties.

TABLE 7

EXAMPLES INDICATING THAT AREAS ONCE INFESTED CONTINUE TO RECORD INFESTATION FOR A LONG TIME

I			II									
Examples of Group of Block Treated for the First Time			Number of Blocks from the Same Group Continued to be Infested Later									
			1965		1966-70		1971-75		1976-80		Jan.-May 1981	
Year (First Treated)	# of Blocks*	# of Houses Treated*	# of blocks	# of houses	# of blocks	# of houses	# of blocks	# of houses	# of blocks	# of houses	# of blocks	# of houses
1965	25	67	25	67	22	78	21	188	21	202	8	9
1966	8	12	-	-	8	25	4	49	5	11	1	14
1971	9	16	-	-	-	-	9	40	9	90	2	3
1976	15	24	-	-	-	-			15	67	2	2
1981	9	12	-	-	-	-	-	-	-	-	9	12

* These figures are included in figures for respective periods under No. II

The largest number of houses treated was in the five year period 1976-1980 when 1,707 homes were treated representing a 169% increase over the 634 homes treated in 1971-1975. However, if the 424 houses treated not under the Termite Control Program but under the Kensington Neighbourhood Improvement Program are excluded, the pattern of change is almost precisely a doubling in the number of homes treated, first from 1966-70 to 1971-75, and then a further doubling in the 1976-80 period. So far there are no signs that this pattern of growth is abating.

TABLE 8

DISTRIBUTION OF HOUSES TREATED BY AREAS AND PERIOD, 1965-1982

	Number of Houses Treated by Period							% Increase by Five-Year Periods	
Areas	1965	1966-1970	1971-1975	1976-1980	1981	1982	Total	1971-75/1966-70	1976-80/1971-75
I - TERMITES AND CARPENTER ANTS									
East	67	302	571	1097	235	214	2486	89	92
Central									
. Excluding Kensington NIP		9	42	53	9	32	145	366	26
. Including Kensington NIP		9	42	477	9	32	569	366	1035
West		3	17	88	33	50	191	500	444
North (Ward 5 only)			1	10	9	17	37		900
Total Termites and Carpenter Ants	67	314	631	1672	286	313	3283	101	165
II - CARPENTER ANTS EXCLUSIVELY - WARDS 10 AND 11									
North . Wards 10 & 11			3	35	24	33	95		1100
Grand Total	67	314	634	1707	310	346	3378	102	169

the carpenter ant problem also appears to be on the increase. The number of new blocks where houses were treated exclusively for carpenter ants in Wards 10 and 11 has grown even more rapidly from an annual average of six in 1976-1980 to the actual number of 18 and 27 blocks respectively in 1981 and 1982.

In the east end, where more than two-thirds of the all cases are concentrated, the number of houses treated almost doubled every five years between 1966 and 1980. For the central area, Ward 6,

the statistics were boosted up by 424 houses treated in Kensington under the Neighbourhood Improvement Program; in terms of the Termite Control Program itself, since 1975 the central area has consistently had fewer cases than the west end. In the north end, Ward 5, where treatement occurred for the first time in 1975 and a total of 37 houses have been treated a growing trend is indicated.

Up to 1975, 90% or more of the houses treated under the Termite Control Program were in the east end, and other areas accounted for only 10% or less. The east end's dominant share dropped to 88% in 1976-1980, to 82% in 1981 and 68% in 1982 (Table 9).

TABLE 9

PERCENTAGE DISTRIBUTION OF HOUSES TREATED FOR TERMITES (AND CARPENTER ANTS) BY AREA AND PERIOD, 1965-1982

	Percentage Distribution of Houses Treated by Period						
Areas	1965	1966-70	1971-75	1976-80	1981	1982	1965-1982
	%	%	%	%	%	%	%
East	100	96	90	88	82	68	87
Central		3	7	4	3	10	5
West		1	3	7	12	16	7
North* (Ward 5 only)				1	3	6	1
Total	100	100	100	100	100	100	100

* Excluding 424 houses treated under the Kensington Neighbourhood Improvement Program from 1976 to 1978 and 95 houses treated for carpenter ants exclusively in Wards 10 and 11 from 1975 to 1982.

9.2 Intensity

In Tables 11, 12 and 13 and Map 2, the intensity of (houses treated for) infestation has been analyzed by geographic areas, broken down by municipal wards as reflected in:

(a) The number of known infested blocks relative to the total number of residential blocks (Table 11).

(b) Number of houses treated relative to total number of houses within the known infested blocks (Table 12).

(c) Distribution of known infested blocks by percentage of houses treated within such blocks ranging from 5%, or less to 50% and more (Table 13). This is also illustrated graphically by Maps 6-8.

Table 10 summarizes the intensity data on a geographic area basis. As stated before, about 15% of the City's residential blocks containing about 22,000 or 20% of the City's 111,000 single family type houses, have so far been subject to or recorded for termite infestation but only about 3,000 or less than 3% of the houses in such blocks have been treated under the Termite Control Program (no data on private treatments).

In 29% of the blocks subejct to treatement, more than 20% of houses (located within these blocks) have been treated. The ratio of such blocks is the highest, 32%, in the east end (Table 10).

Variations within the geographic areas are detailed on ward level in Tables 11-13.

TABLE 10

INTENSITY OF INFESTATION BASED ON NUMBER OF INFESTED BLOCKS* AND NUMBER OF HOUSES** TREATED, BY AREA, 1965-1982

Area & Wards	Total # of Blocks	Infested Blocks* #	Infested Blocks* %	Total # of Houses** in Infested Blocks	Total Houses Treated #	Total Houses Treated %	% of Treated Blocks Where More Than 20% Houses Treated
I - TERMITES AND CARPENTER ANTS							
West (1-4)	906	29	3	2,253	191	8	24
Central (6)							
. excluding Kensington NIP	461	25	5	1,479	145	10	25
. including Kensington NIP	461	31	7	1,758	569	32	58
East (7-9)	783	284	36	15,825	2,486	16	32
North (5)	251	18	7	1,408	37	3	NIL
Total - Termites and Carpenter Ants	2,401	362	15	21,244	3,283	13***	29
II - CARPENTER ANTS EXCLUSIVELY, WARDS 10 AND 11							
North (10 & 11)	679	84	12	3,719	95	3	NIL
Grand Total	3,080	446	14	24,963	3,378	12***	23

* The term "infested block" refers to blocks where one or more cases of infestation have been found.

** The term "houses" refers mainly to the following categories of housing predominantly the subject of treatment under the Termite Control Grants Program - owner occupied, tenant occupied single residences and owner/tenant (jointly) occupied houses.

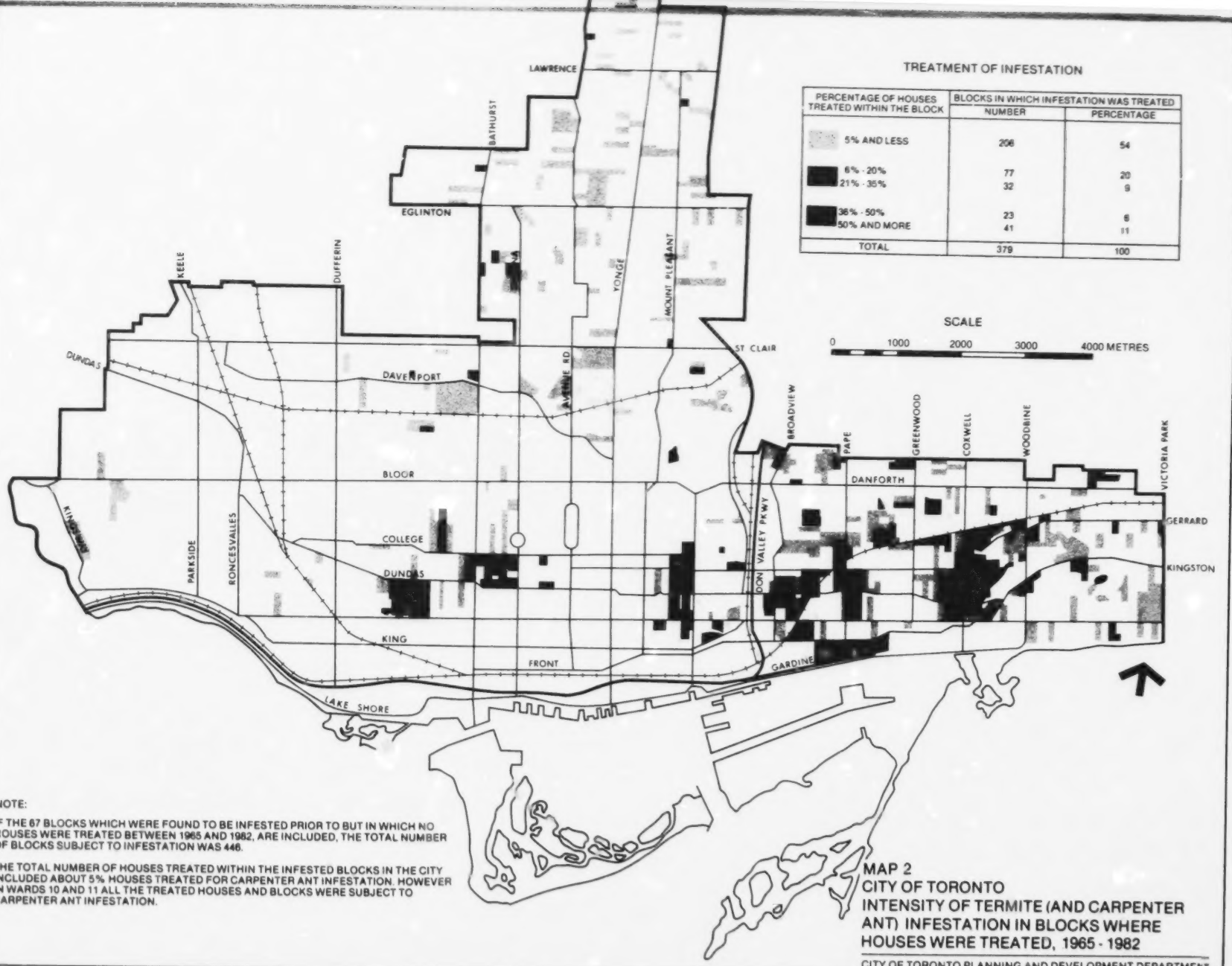
*** The percentage is based on exclusion of 424 houses treated under the Kensington Neighbourhood Improvement program.

TABLE 11

DISTRIBUTION OF BLOCKS BY TOTAL NUMBER AND NUMBER OF INFESTED BLOCKS BY AREA AND WARD - 1965-1982

Area & Ward		Total No. of Blocks	Number of Infested Blocks: Subject to Treatment	Not Yet Subject to Treatment	Total	Infested Blocks as % ot Total Blocks
I - TERMITES AND CARPENTER ANTS						
West	1	289	4	2	6	2
	2	187	4	1	5	3
	3	226	2		2	1
	4	204	16		16	8
Total		906	26	3	29	3
Central	6	461	26*	5	31	7
East	7	251	68	21	89	36
	8	251	81	11	92	37
	9	281	82	21	103	37
Total		783	231	53	284	36
North	5	251	18		18	7
Total Termites/ Carpenter Ants		2,401	301	61	362	15
II - CARPENTER ANTS EXECLUSIVELY IN WARDS 10 AND 11						
North	10	313	30	4	34	11
	11	366	48	2	50	14
Total Carpender Ants		679	78	6	84	12
Grant Total I and II		3,080	379	67	446	14

* Including six blocks in which houses have so far been treated exclusively under the Kensington Neighbourhood Improvement Program between 1976 and 1978.



NOTE:

IF THE 67 BLOCKS WHICH WERE FOUND TO BE INFESTED PRIOR TO BUT IN WHICH NO HOUSES WERE TREATED BETWEEN 1965 AND 1982, ARE INCLUDED, THE TOTAL NUMBER OF BLOCKS SUBJECT TO INFESTATION WAS 446.

THE TOTAL NUMBER OF HOUSES TREATED WITHIN THE INFESTED BLOCKS IN THE CITY INCLUDED ABOUT 5% HOUSES TREATED FOR CARPENTER ANT INFESTATION. HOWEVER IN WARDS 10 AND 11 ALL THE TREATED HOUSES AND BLOCKS WERE SUBJECT TO CARPENTER ANT INFESTATION.

MAP 2
CITY OF TORONTO
INTENSITY OF TERMITE (AND CARPENTER ANT) INFESTATION IN BLOCKS WHERE HOUSES WERE TREATED, 1965 - 1982

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT

TABLE 12

DISTRIBUTION OF TOTAL NUMBER OF HOUSES* WITHIN THE INFESTED BLOCKS AND NUMBER OF HOUSES TREATED, 1965-1982

Area & Ward		Total Number of Houses* Within the Infested Blocks (a) Where Houses Have Been Treated	(b) Where Houses Have Not Yet Been Treated	Total of (a) & (b)	Houses Treated Number	As % of Houses Within the Blocks
I - TERMITES AND CARPENTER ANTS						
West	1	483	46	529	4	0.76
	2	326	3	329	9	2.74
	3	177		177	2	0.93
	4	1,218		1,218	176	14.45
Total		2,204	49	2,253	191	8.47
Central	6	1,729	29	1,758	569**	32.37
East	7	3,520	431	3,951	923	23.36
	8	6,081	316	6,397	985	15.40
	9	4,554	923	5,477	578	10.55
Total		14,155	1,670	15,825	2,486	15.11
North	5	1,408		1,408	37	2.63
Total Termites & Carpenter Ants		19,496	1,748	21,244	3,283	15.45
II - CARPENTER ANTS EXCLUSIVELY IN WARDS 10 AND 11						
North	10	1,510	160	1,670	40	2.40
	11	1,992	57	2,049	55	2.68
Total Carpenter Ants		3,502	217	3,719	95	2.55
Grand Total I & II		22,998	1,965	24,963	3,378	13.53

* Mainly owner occupied tenant occupied, single residence and owner/tenant (jointly) occupied houses.

** Including 424 houses treated not under the Termite Control Grants Program but under the Neighbourhood Improvement Program for Kensington from 1976 to 1978. Under the Termite Control Grants Program only 145 or 10% of total houses were treated.

TABLE 13

DISTRIBUTION OF BLOCKS BY PERCENTAGE OF HOUSES TREATED WITHIN THE TREATED WITHIN THE BLOCKS BY AREA AND WARD, 1965-1982

Area	Ward		# of Blocks by % of Houses Treated*				
			5% or less	6-20%	21-35%	36-50%	50%+	Total # of Blocks
I - TERMITES AND CARPENTER ANTS								
West	1		4					4
	2		4					4
	3		2					2
	4		7	3	1	3	2	16
Total		#	17	3	1	3	2	26
		%	65	11	4	12	8	100
Central:	6							
. excluding Kensington NIP		#	10	5	5			20
		%	50	25	25			100
. including Kensington NIP		#	7	4	2	3	10	26
		%	27	15	8	12	38	100
East	7		20	17	9	8	14	68
	8		36	19	9	6	11	78
	9		43	21	11	3	4	82
Total		#	99	57	29	17	29	231
		%	43	25	13	7	12	100
North	5	#	15	3				18
		%	83	17				100
Total Termites and Carpendter Ants		#	138	67	32	23	41	301
		%	46	22	11	8	13	100
II - CARPENTER ANTS EXCLUSIVELY								
North	10	#	26	4				30
	11	%	42	6				48
Total		#	68	10				78
		%	87	13				100
Grand Total		#	206	77	32	23	41	379
		%	54	20	9	6	11	100

* Including 424 houses treated under the Kensington Neighbourhood Improvement Program

9.2.1 East End

The termite problem has been most serious and widespread in the east end of the City:

- Where more than one out of four blocks (36%) have been subject to infestation and where 16% of the houses located in the infested blocks within the area have been treated;
- Which contained 78% (284) of the 362 (mainly termites) infested blocks and 74% (15,825) of the 21,244 houses located in such blocks;
- Which accounted for 87% (2,486) of the 2,859 houses treated mainly for termites; and
- Where more than 20% of houses (located within the blocks) have been treated in 32% of the infested blocks.

Within the east end the termite problem is more serious in Wards 7 and 8 than in Ward 9.

9.2.2 Central Area (Ward 6)

In Ward 6 where houses were treated in 26 (6%) of the 461 blocks (Table 11), six blocks and 424 houses accounted for as stated before by treatment under the Kensington Neighbourhood Improvement Program (NIP). Because of Kensington NIP Ward 6 accounted for the highest percentage of houses treated within the infested blocks, i.e. 36% or 569 houses, out of a total of 1,758, as well as the highest intensity, i.e. more than 20% of houses treated in 58% of the infested blocks which were subject to treatment between 1965 and 1982. However discounting the Kensington NIP, under the Termite Control Program 145 houses were treated in 25 (5%) of the 461 blocks, the percentage of total houses treated within infested blocks was 10% and the percentage of blocks (subjec to treatment) where more than 20% of the total houses (treated) were treated was 25% (Tables 5, 11, 12 and 13).

9.2.3 West End, Wards 1-4

Houses were treated in 26 of the 906 blocks in the area but the total number of blocks subjec to infestation was 29 or 3% of the blocks. The 29 blocks contained 2,253 houses out of which 191 or 8% were treated for infestation. Of the houses treated in the area, 176 or 92% were in Ward 4, nine or 5% in Ward 2 and the remaining six or 3% of the houses treated were in Wards 1 and 3. In 24% of the infested blocks subjec to treatment more than one house in five was treated, compared with 32% of the blocks in the east end and 25% of the blocks in the Central Area (excluding Kensington NIP). In Ward 4 infestation was first treated in 1970 in one house. Since then, with the exception of 1972, increasing

numbers of houses have been treated each year, more particularly from 1979.

In the north end, Ward 5 infestation was first treated in 1974 and has been treated since, except in 1975 and 1977. The number has been growing from five in 1980 to nine in 1981 and 17 in 1982 to a total of 37. Treatment has occurred in 18 (7%) of the 251 blocks which contain a total of 1,408 houses.

9.2.4 North End, Wards 10 and 11

In the north end 95 houses in 78 blocks were treated exclusively for carpenter ant infestation between 1975 and 1982. the total number of blocks subject to infestation was 84 (12%) out of a total of 679 blocks. the infested blocks contained 3,719 houses out of which 95 or 2.5% were treated. The largest number of houses, i.e. 24 and 33 were treated in 1981 and 1982 in 18 and 27 new blocks respectively. This reflects a greater awareness of the problem by homeowners and the availability of City grants for treatment of carpenter ant infestation. Although no instance of treatment for termite infestation has occurred in the two wards yet, considering the historical growth pattern there can be no certainty that termites will not some time in future invade the north end. Termite infestation has already been recorded in the City of North York.

9.3 Infestation in Trees

In the summer of 1980 Professor Paul A. Cooper of the Faculty of Forestry, University of Toronto, carried out a survey of all municipally owned trees on the boulevards and in parks within the known areas of termite infestation in Toronto, East York and Scarborough.(11) The purpose of the survey was to evaluate the relationship between termite activity on trees and tree characteristics, the nature and extent of termite damage to trees and the effectiveness of several chemical treatments to control termites on trees. The survey indicated that of the more than 17,000 trees inspected about 700 had termite infestation. The survey report includes no maps or statistics indicating the number of infested trees found in the City. However, further investigation in connection with the present study indicated that 11,740 (or 69%) of the trees surveyed were in the City and that 568 (81%) of the infested trees were found within the City. The 28 Property Data Map areas in which these infested trees were found contained 61% of the blocks and 80% of the houses which had been subject to treatment for termite infestation up to the middle of 1981 (Table 14 and Map 3).

Within the City 72% of the infested trees were accounted for by the East End which also accounted for more than 70% of the blocks and 75% of the houses subject to infestation. The analysis in Table 15 indicates that the intensity of tree infestation in the

East End and within the combined area of West End and Downtown, respectively, was proportionate to the number of blocks and houses treated for infestation in the two areas.

TABLE 14

DISTRIBUTION OF INFESTED TREE AREAS BY NUMBER OF INFESTED TREES FOUND IN 1980

Wards	Number of Infested Tree Areas*, 1980		Number of Infested Trees, 1980	
	#	%	#	%
East End	22	79	410	72
West End and Central Area	6	21	158	28
	28	100	568	100

* Property Data Map Areas

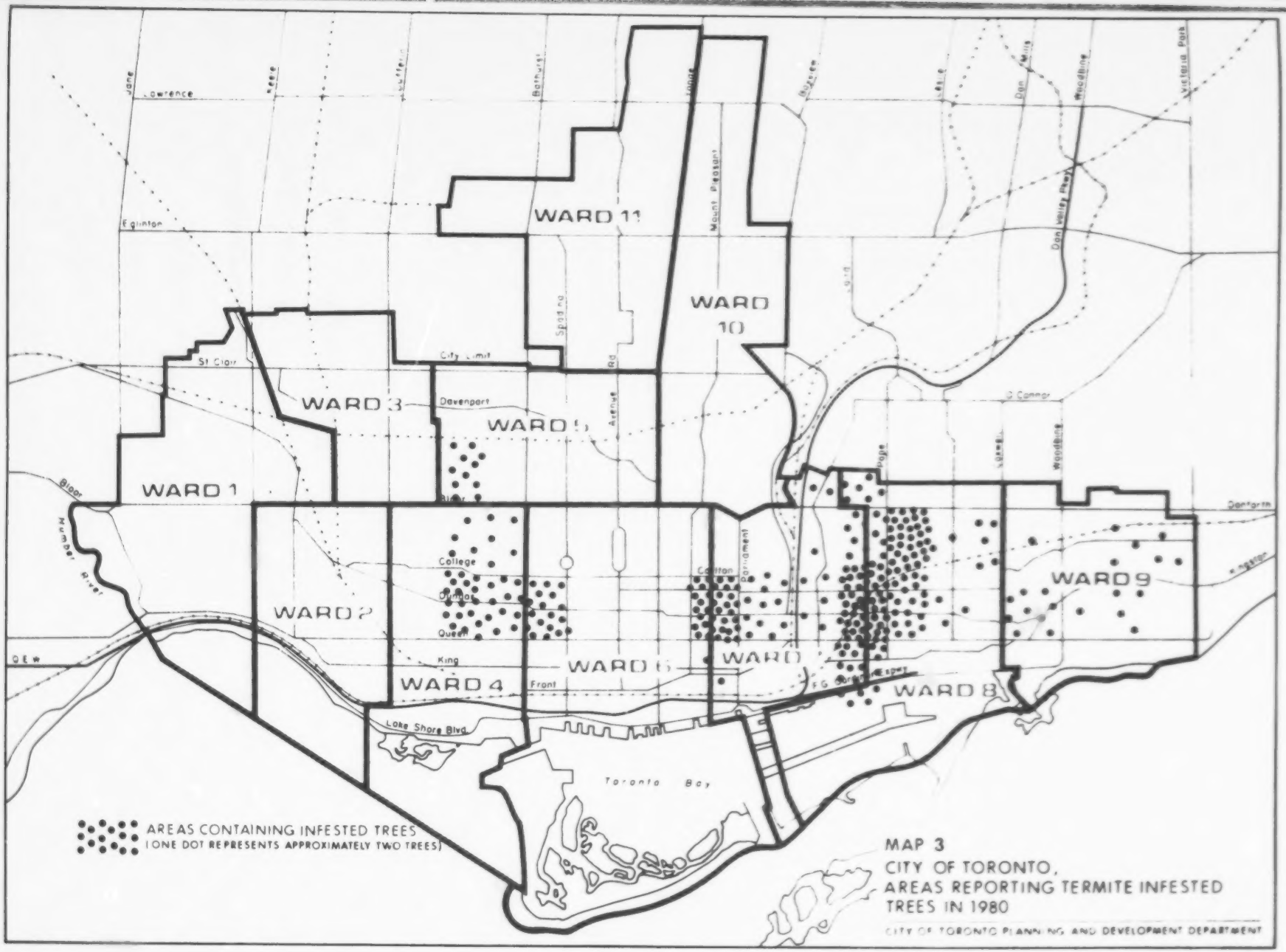
** The 205 infested blocks located within the 28 infested tree areas represented 61% of the 338 blocks which were subject to infestation up to May 1981. The balance of the infested blocks were located in areas where no infested trees were recorded.

*** The 2,248 treated houses located within the infested tree areas represented 80% of the 2,809 houses treated to May 1981. The balance of treated houses were located in areas where no infested trees were recorded.

TABLE 15 - BLOCKS AND HOUSES SUBJECT TO INFESTATION IN RELATION TO INFESTED TREES

	Blocks Subject to Property Infestation to 1982		Block in Which Infested Houses were Treated 1965-1982		Infested Houses Treated 1965-82		Infested Trees 1980	
	#	%	#	%	#	%	#	%
East End (Wards 7-9) 2	284	78	231	77	2,486	75	410	72
West (West, Central and North Areas)*	78	22	70	23	797	24	158	28
Total	362	100	301	100	3,283	100	568	100

* Excluding Wards 10 and 11



MAP 3
CITY OF TORONTO,
AREAS REPORTING TERMITE INFESTED
TREES IN 1980

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT

Other findings of the (tree) Survey are summarized below:

(a) Termites do occasionally establish colonies inside living trees. (The Survey discovered ten trees harbouring termite colonies.) They favour certain species of trees over others.

(b) Trees with decaying wounds or branch stubs and hollow spaces are more likely to be infested than sound trees.

(c) Older large diameter trees are favoured more than trees with smaller diameters.

(d) Termites were more commonly found on trees close to buildings, which provided a relatively warmer environment, than on trees in more open areas such as parks or cemeteries. Their presence in trees close to houses continues to be a potential threat to all the unprotected or inadequately protected houses or other buildings in surrounding areas.

(e) Structural damage to trees caused by termites is generally not serious. However infested trees, particularly those with active colonies housing large numbers of termites including reproductive and worker castes, can serve as centres of foraging activities posing danger to other trees and buildings in the neighbourhood. Furthermore, if wood from trees harboring active colonies is removed to another area without being thoroughly sterilized it can start a new colony.

(f) Spraying, brushing and fumigation of trees with insecticides kills termites but because of its short term effect it provides no guarantee against reinfestation unless accompanied by proper sterilization of soil around the tree.

The City of Toronto Parks and Recreation Department is aware of the findings of the Survey. The department has a general program of treatment of municipally owned trees against insects and pests including termites. Termite infested trees are treated on a spot basis if and when the problem is brought to the notice of the department by a neighbourhood resident, City Buildings and Inspections Department official or some other source.

10. TREATMENT AND ITS EFFECTIVENESS

10.1 Chemical Control

No safer or equally effective alternatives to chemical control of termites through the use of insecticides have yet been developed. Prompted by environmental concerns, research on alternatives including biological controls has been ongoing in the U.S.A. and elsewhere but none have so far been found.(12) The present "state of the art" therefore provides no better choice than the use of insecticides.

Chemical treatment against wood destroying insects including termites and other pests can be employed in the form of fumigation, use of poisoned baited blocks and injection of water-based emulsions of insecticides into the ground.

10.1.1 Fumigation

In the United States, fumigation with toxic insecticide vapours is frequently used in treating isolated termite infestation in structures, trees, plants or imported material. It kills the insects in the treated spot or material but provides no lasting protection against re-infestation.

10.1.2 Treated Bait Blocks

Treated wooden bait blocks have been used by locating such blocks strategically in infested areas for attracting and killing foraging termites. But no bait block system has yet been developed which works successfully in actual field conditions.

10.1.3 Chemical Treatment of Soil

Chemical treatment of soil has been used as the sole means of treating termite infested homes in Toronto under the Termite Control grants program. The provincial government under its pesticides control policy initially allowed the use of chlordane, Aldrin, Dieldren and Heptachlor but later restricted use to the first two chlorinated hydrocarbon chemicals. Dieldrin and Heptachlor have since been withdrawn from Canadian markets. Chlordane and Aldrin are still permitted.

Chemical treatment of particular structures or spots which serve as sources of food to termites does not directly eradicate the colonies where they live permanently. The colonies, which can exist underground at yet undetermined depths away from the treated spot, are almost impossible to detect and treat. Injection of insecticides into the ground, underneath or around a structure kills the termites which happen to be there at the time. It also creates a long-term poisoned barrier which the termites, still existing in their colonies, cannot penetrate for as long as the

treated area remains continuous and undisturbed and the effect of chemicals persists.

The treatment in Toronto with Chlordane and Aldrin, performed by exterminators licensed by the Ministry of the Environment for termite control can, depending on particular circumstances, consist of:

(a) pressurized injection of water-based emulsion of the toxic insecticide into the soil around the exterior of solid foundations and into the wall void of hollow masonry foundations, down to the footings;

(b) Similar treatment under the basement floor through holes drilled adjacent to the foundation walls and supporting columns;

(c) Injection of insecticides through drilled holes in the basement wall; and

(d) Treatment of other areas such as around garages, shrubs or trees.

If chemical treatment is properly performed, all existing direct wood/soil contact is eliminated and the barrier is not disrupted by excavation, etc. protection can be expected to last for 25 years or more.

Protection is more effective if, rather than treating individual properties, all the properties within a block subject to infestation or potential infestation are treated at the same time. It is still better if all adjoining blocks are treated simultaneously as was done under the Kensington Neighbourhood Improvement Program.

Though there had been no specific City by-law requiring chemical pre-treatment of sites of new buildings until recently, the Buildings and Inspections Department advised applicants for building permits from termite active areas to have their sites pre-treated, as a measure of safeguard against potential infestation.

10.2 Physical Control

Chemical control of termites can be more effective if it is complemented by prior measures of a physical nature such as the following:

(a) Adequate clearance between soil and wood, e.g. at least 18 inches or about 460 millimetres;

(b) Capping of hollow block masonry foundations;

(c) Removal of stumps, unnecessary wood and wood products from around the structure;

(d) use of chemically impregnated wood where soil contact can not be avoided and provided subsequent cuts and holes in such wood in the process of construction have also been satisfactorily treated so that it does not lose its immunity;

(e) Proper drainage and ventilation of basement and crawl space and prevention or stopping of water leakage; and

(f) Sealing of all crevices and cracks in foundations, walls, floors and around plumbing and wiring, etc.

Many of these measures are covered by provisions for new buildings in termite active areas in the National and Ontario Building Codes and the City of Toronto Building By-law.

Some of the measures (e.g. capping of foundations), may not be feasible for existing buildings but even their limited application, along with chemical treatment, can provide added protection to existing structures. For example, removing of wood/soil contact can be cited as a good example of physical control measures.

10.3 Effectiveness of Treatment

As documented by the analysis in the tables below, chemical treatment has proved to be quite effective as a measure of protection of treated properties against, if not eradication of, termites. It was encouraging to note that re-infestation had occurred only in about 4% of the treated houses between 1965 and 1980 (Tables 16 and 17). The figure would be somewhat higher if cases where reinfestation was treated by the pest control operators under their warranties were taken into account, but no information was available on such cases.

TABLE 16

DISTRIBUTION OF HOUSES INITIALLY TREATED AND HOUSES SUBJECT TO RE-TREATMENT BY PERIOD OF INITIAL TREATMENT, 1965-1980

Period Initially Treated	Number of Houses Initially Treated	Houses Which Required Re-Treatment #	Houses Which Required Re-Treatment %
1965	67	5	7.0
1966-1970	314	24	7.6
1971-1975	634	41	6.5
1976-1980	1,707	27	1.6
Total	2,722*	97	3.6

TABLE 17

DISTRIBUTION OF HOUSES INITIALLY TREATED AND HOUSES SUBJECT TO RE-TREATMENT BY WARDS, 1965-1980

Ward	Number of Houses Initially Treated	Houses Which Required Re-Treatment #	Houses Which Required Re-Treatment %
1-3	11	-	-
4	97	2	2
5	11	-	-
6	528	5	1
7	765	38	5
8	854	39	5
9	418	13	3
10-11	38	-	-
Total	2,722	97	3.6

The follow-up survey carried out in the summer of 1981 also confirmed the effectiveness of chemical treatment and low incidences of re-infestation (Section 11.3.8).

As the table below indicates, in more than 70% of the instances re-infestation was treated within less than seven years of initial treatment, including 40% retreated within three years.

In about 30% of the cases retreatment occurred six or more years after the initial treatment including 17% retreated after ten or more years.

TABLE 18

DISTRIBUTION OF HOUSES SUBJECT TO RETREATMENT BY INTERVAL (YEARS) BETWEEN INITIAL TREATMENT AND RETREATMENT

Period Initially Treated	Number of Houses Retreated by Interval					
	Total Number	1-3 years	4-6 Years	7-9 Years	10-12 Years	Over 12 Years
1965	5	2	--	2	1	--
1966-1970	24	2	1	7	13	1
1971-1975	41	19	18	2	2	--
1976-1980	27	16	11	--	--	--
Total	97	39	30	11	16	1
%	100	40	31	12	16	1

Reinfestation can occur because of any one or a combination of reasons such as faulty treatment due to defective equipment or chemicals, continuation of direct wood/soil contact, and subsequent disruption of treated areas through excavation, etc. In most cases reinfestation occurred because wood/soil contact was not broken. As more home owners take advantage of wood/soil separation grants, which largely became available in 1978, it is expected that incidence of reinfestation will decline further.

Introduction of improved general specifications as of March 1, 1982 (Appendix 2) is also expected to make the treatment more effective and minimize the risk of reinfestation. These specifications cover:

- the disposal of infested material;
- basic equipment to be used by pest control operators;
- better warranty provision covering treatment by operators, and
- the responsibility of property owners to ensure that treatment is not disturbed

10.4 Insecticides and Environmental Concerns

Chlordane and Aldrin (13) being used for termite control in Toronto are both chlorinated hydrocarbon insecticides. Both possess "relatively high mammalian toxicities". Also of concern are such questions as "How long do they persist in the ground?" and "At what rate do they move to surrounding soil and to sub surface water supplies?". Studies by the U.S. Department of Agriculture, based on tests in a southern Mississippi sandy loam soil, indicated the 100% continued effectiveness period of Chlordane (1%) as 30 years, and that of Aldrin (0.5%) as 29 years. The soil analysis indicated that the chemicals interacted strongly with soil particles and moved only a few inches over long periods of time. On the basis of the above-mentioned tests, and the absence of other evidence to the contrary, the termite treatment with these chemicals is so far considered environmentally safe, and effective for a long time. However, soil conditions and climate should be recognized as important factors influencing not only the effectiveness of treatment but also the environmental impact of the insecticides used.

Concern about the use of insecticides in general and more particularly their use in certain City operations where they have to be handled by City personnel is being recognized by the City Administration.

As a result of concerns expressed by the Health Advocacy Unit of the City's Public Health Department, through the Local Board of Health, the City has restricted the use of chemicals to five by the Parks and Recreation Department, from 22 found in the inventory of that department in 1981. Two of the five are considered essential for weed control and the remaining three, including chlordane, for control of insects. Their use is to be retained because no safer alternatives are available.

The consulting entomologist retained by the City is expected to evaluate the long term environmental implications of the continued use of chlordane and Aldrin in Toronto.

11. FOLLOW-UP SURVEY 1981

11.1 Introduction

As stated earlier in this report, from the inception of the City of Toronto Termite Control Program in 1965 to the end of 1982, over 3,000 house form type dwellings had been treated under the program. Properties in more than 360 City blocks had been subject to termite infestation at one time or another.

In order to evaluate the effectiveness of the treatment financed under the Termite Control Program, the Buildings and Inspections Department selected 161 treated homes for a follow-up physical survey carried out in the summer of 1981. It was possible to inspect a high percentage of the selected dwellings, i.e. 139 or 86%. The remaining 14% could not be surveyed because of unavailability or refusal of owners or occupants.

TABLE 19

NUMBER OF TREATED DWELLINGS SELECTED AND INSPECTED FOR SURVEY

Year Treated	Dwellings Treated	Dwellings Selected		Dwellings Inspected	
		Number	Percentage	Number	Percentage
1965	67	10	15	10	15
1971	83	5	6	5	6
1975	210	7	3	6	3
1976	313	112	36	94	30
1977	389	20	5	18	5
1978	460	4	1	4	1
1979	269	3	1	2	1
	1,791	161	9	139	8

11.2 Methodology

The size of sample and the number of dwellings selected by the year in which they were treated or the areas of the City where they were located was mainly dictated and limited by the following:

(a) Availability of financial and manpower resources and time: The survey had to be completed in the three months of summer between June and September 1981 by students employed and paid for jointly by the Province of Ontario and the City of Toronto under the Province's Experience 81 Program.

(b) Availability of record of dwellings treated in the past: As records of houses treated in the past were assigned after a certain length of time to City Archives, and even in the Archives not all records were retained beyond a certain time limit, selection for the survey had to be restricted to whatever records were readily available. For example, the largest number of records available were for the year 1976, i.e. for 112 dwellings all of which were selected for the survey (Table 19).

(c) A period of about fives years between the treatment and evaluation of effectiveness was considered a reasonable interval and it was important to include a significant number of dwellings which met this qualification.

Fortunately 68% of the houses selected and surveyed represented those treated between five and five and one-half years ago. The balance, i.e. 32%, represented houses treated either earlier or later than five years (Table 20).

TABLE 20

DISTRIBUTION OF DWELLINGS BY INTERVAL BETWEEN TREATMENT AND 1981 FOLLOW-UP SURVEY

Treated Years Ago	Year Treated	Dwelling Surveyed	
		Number	Percentage
10 - 16	1965 & 1971	15	11
6 - 6.5	1975	6	4
5 - 5.5	1976	94	68
4 - 4.5	1977	18	13
2-1/2 - 3.5	1978 & 1979	6	4
		139	100

The highest percentage of dwellings surveyed (83%) were located in the east end which also contained the overall highest percentage (75%) of dwellings treated against termite infestation in the City since 1965 (Table 21).

TABLE 21

PERCENTAGE DISTRIBUTION OF DWELLING SURVEYED IN 1981 AND DWELLINGS TREATED SINCE 1965 BY AREAS

Areas	Surveyed 1981 %	Treated Since 1965 %
East End - Wards 7-9	83	75
Downtown - Ward 6	9	19
West End - Wards 1-5	8	5
North End - Wards 10-11	0	1
	100	100

However, the wider disproportion between other areas indicated in Table 21 was partly due to the difficultly in the availability of records as noted earlier.

An advance notice of survey and request for co-operation were sent to each of the owners/occupants of selected houses. Trained research assistants made appointments, interviewed the occupants, and inspected the property at the convenience of occupants. At the time of inspection they carried a list of the treatment work done in the past on the subject dwellings and checked for a recurrence of the problem with particular reference to that list. The information obtained was recorded for each dwelling on a questionnaire.

In addition to the selected dwellings, adjacent houses were also checked externally for any sign of termite infestation or reinfestation.

Besides field work, the students tabulated the survey information and collected additional data relevant to the overall study of the problem and the control program. They also plotted all the houses treated under the program since 1965 on property data maps and prepared additional maps showing graphically the spread and intensity of the problem in various areas of the City.

11.3 Survey Results

11.3.1 Tenure

Ninety-four per cent of the homes surveyed were occupied by owners and 6% by tenants. Sixty-eight per cent of the owners had owned their home at the time of treatment and 32% had acquired the properties later.

11.3.2 Age and Income

Only 82 out of 139 (59%) respondents disclosed information about both their age and total family income as at the time of survey. An inverse ratio was observed in the distribution of respondents by age and income groups. A significant percentage of respondents (37%) had incomes of less than $15,000; more than half of these were senior citizens, and no seniors reported a total family income greater than $15,000. These low income families would likely have difficulty in having their homes treated without government assistance. The majority of younger persons were in the higher income groups (Table 22).

TABLE 22

DISTRIBUTION OF RESPONDENTS BY AGE AND FAMILY INCOME GROUPS

	Age Groups							
	20 - 44		45 - 64		65 and Up		Total	
Income Groups	#	%	#	%	#	%	#	%
Under $,5000	1	3	5	19	14	82	20	24.4
$ 5,000-$ 9,999	2	5	1	4	2	12	5	6.1
$10,000-$14,999	1	3	3	11	1	6	5	6.1
$15,000-$19,999	6	15	9	33	-	-	15	18.3
$20,000 and over	28	74	9	33	-	-	37	45.1
Total	38	100	27	100	17	100	82	100.0

11.3.3 Cost of Chemical Treatment and Grants

Information on chemical treatment cost was available for all of the 161 selected dwellings. The average cost per dwelling ranged from a low of $200 for Ward 4 to a high of $466 for Ward 7. Table 23 gives the average cost by source of funds. As more than 90% of the selected dwelling were treated under the old City/Provincial grant not exceeding $250, the average cost and grant was not significantly influenced by the much larger provincial grant of up to $2,000, including the cost of wood-soil separation, which started to be given late in 1977.

TABLE 23

AVERAGE COST OF TREATMENT BY SOURCE OF FUNDS

Source of Funds	Average Cost Per Dwelling	
	$	%
1. City of Toronto	109.63	27
2. Ontario	114.47	29
3. Homeowner	175.44	44
Total Cost	399.54	100

11.3.4 Housing and Structure Type

The majority of housing treated had the solid brick type of structure, i.e. 62%, compared with wood frame with brick veneer, 9% and purely wood frame, 29%.

Semi-detached (48%) and row houses (32%) were predominant compared with detached houses (20%).

11.3.5 Treatment of Adjoining Houses

It is certain that infestation once established does attack adjoining properties if not prevented or treated. One hundred and fifty-nine or 57% of the adjoining houses had been treated in addition to the 139 surveyed. For every house surveyed 1.4 (out of the maximum of two) adjoining houses were also found to have been treated. The percentage was higher in Ward 6 (71%), Ward 7 (65%) and Ward 8 (59%), because of predominance of attached dwellings in those wards and lower in Ward 4 (39%), Ward 5 (50%) and Ward 9 (39%). Similarly the average number of adjoining houses treated per surveyed dwelling was higher in Wards 6, 7 and 8 and lower in Wards 4, 5 and 9. No adjoining houses were treated in Wards 1, 2, 3, 10 and 11.

TABLE 24

PERCENTAGE AND AVERAGE NUMBER OF ADJOINING HOUSES TREATED PER DWELLING, BY AREA

Area	Percentage of Adjoining Houses Treated	Average Number of Adjoining Houses Treated Per Surveyed Dwelling
East End - Wards 7-9	49%	0.97
Downtown - Ward 6	71%	1.40
West End - Wards 4 and 5	41%	0.81
Total	57%	1.41

The majority of adjoining houses were treated for actual infestation and a small number as a matter of precaution.

In additon to the main building, five out of the 15 surveyed houses which had ancillary structures, e.g. porch, shed, garage, etc. had such structures treated as well.

11.3.6 Wood-Soil Contact

Older houses in which the wood members of the building such as joists, posts, steps or fences, etc. are in direct contact with the ground (soil) have a greater susceptibility to termite infestation than those where such direct contact does not occur. Sixty-three per cent of the surveyed dwellings indicated the existence of wood/soil contact and 13% had acquired such contact following treatment for infestation. Sections of the east end and downtown, where the evidence of infestation is the highest, have a large number of houses in which wood/soil contact does occur and this is reflected in Table 25.

TABLE 25

PERCENTAGE OF SURVEYED DWELLINGS SUBJECT TO WOOD-SOIL CONTACT BY AREA

	Contact Existed Before Treatment and Continuing	Contact Occurred After Treatment	Total Dwellings Subject to Wood/Soil Contact
East End - Wards 7-9	57%	14%	71%
Downtown - Ward 6	17%	8%	25%
West End - Wards 4 and 5	9%	9%	18%
Total	50%	13%	63%

Larger treatment grants of up to $2,000, which became available at the end of 1977, from the Ministry of the Environment, would make it possible for home owners to undertake measures that would break or minimize wood-soil contact. However, no instances of wood-soil separation work were found among the six houses surveyed which were treated since the inception of the wood/soil separation grant program.

11.3.7 Possible Loss of Immunity

Excavation and removal of sterilized or treated soil on account of new construction, addition or alteration, etc. can disturb the immunity of the treated area making it more susceptible to termite reinfestation. In 118 or 85% of the 139 houses no new construction, etc. had occurred. Among 21 or 15% of the houses where construction, etc. had occurred following treatment, it was suspected that in six houses (or 4% of the houses) immunity may have been disturbed. Possible re-infestation in such instances could be prevented through retreatment of disturbed areas. Only a single owner (out of 6) was found to have had the disturbed area of his property re-treated.

11.3.8 Reinfestation

The student research assistants who surveyed the 139 selected dwellings suspected, on the basis of occupant's statements and their own observation, that termite reinfestation may be occurring on 15 properties. However, on the basis of result of reinvestigation and analysis by the Termite Control Officer, active infestation was confirmed only in two cases. In both instances it was found in structures other than the house, i.e.

garage and fence where wood-soil contact had continued to exist because the properties were treated in 1976, before the wood-soil grants became available. The owners of both the houses were advised to have the problem corrected. Table 26 below gives an analysis of the suspected cases.

TABLE 26

ANALYSIS OF 15 CASES OF SUSPECTED REINFESTATION

Active reinfestation confirmed in garage and fences caused by continued wood-soil contact	2
No evidence of termite reinfestation found	6
Reinfestation occurred but treated before the survey	3
No termite but carpenter ants infestation	1
Termite colony in the ground or infestation in trees	3
Total	15

11.4 Conclusion

The follow-up survey confirmed that chemical treatment, if properly performed and not subsequently disturbed by excavation, etc. coupled with the physical measure of avoiding or, in existing buildings, removing any direct wood/soil contact, provides an effective long term protective screen against termite infestation of treated properties.

APPENDIX 1

ANALYSIS OF ISSUES CONCERNING TERMITE CONTROL BY-LAW WITH REFERENCE TO SECTION 8.5 OF THIS REPORT

Issues	Comments
1. Definition of Building and Structure Subsections (a) and (b) of Section 1 of By-law No. 189-73 defines residential building and "dwelling unit". These definitions apply only in so far as grants or loans under Sections 4 and 5 are concerned and not as to other Sections (i.e. 2a, 2b and 3) dealing with enforcement, which refer to "building or structure". The issues is whether or not it is necessary to amend By-law No. 189-73 so as to define the terms "building or structure" which appear in Sections 2a, 2b and 3 for purpose of enforcement, though the intention is not to extend the grants and loans provisions to such "buildings and structures".	It does not seem necessary to amend the By-law. The By-law uses the terms "building or structure" in Sections 2a, 2b and 3 on the authority of enabling legislation (Section 46, Subsections 22 and 23 of The Planning Act) which provides for authority to the City for enforcement in respect of any buildings or structures.

Issues	Comments
2. Whether Fences, Decks, Etc. Included Whether or not the By-law gives the City the authority to enforce in respect of structures (other than main or ancillary buildings), not regulated by the Ontario Building Code or the Housing (Residential) and Non-Residential Standards By-laws, such as wood fences, wood sundecks, wood landscaping features such as garden retaining walls and flower boxes, etc.?	Unless challenged in a court of law and ruled otherwise it should be assumed, in the light of enabling legislation which itself refers to "building or structure", that the By-law as it is, does apply to the subject "structures" and that it is for the Chief Building Official to decide what is a "structure". It, therefore, does not appear necessary at this stage to make specific provision in the By-law in regard to the subject structures.

Issues	Comments
3. Definition of Owner	
Whether or not the By-law should be amended for purpose of notice and enforcement to include a definition so as to include "owner", as well as owner's agent?	The authority to include the agent of the owner is doubtful, and enabling legislation may have to be sought if the intention is to do so. Since the City has had no difficulty so far in regard to notice and enforcement it is not considered necessary at this stage to amend the By-law.

Issues	Comments
4. Powers of Entry	
Whether or not the By-law needs to be amended to provide for authority for entry and inspection at all reasonable hours of infested or neighbouring property?	Although the enabling legislation and the By-law No. 189-73 as amended do not in themsleves provide for entry, the Housing Standards By-law No. 73-68 as amended and the Non-Residential Standards By-law No. 376-73 have standards concerning termites and other insects and prevention of infestation. For the purpose of these By-laws the the powers of entry are provided for in the City of Toronto Act, 1936 (Section 6) as amended and the City of Toronto Act, 1971 (Section 11) as amended. It is, therefore, not necessary to amend the By-law in this regard.

Issues	Comments
5. Specifications	
Whether or not the By-law provides for authority for issuing specifications governing treatment, repairs and disposal of infested material, etc. and whether such regulations or specifications should be incorporated into the By-law itself or whether they should be issued separately?	Sections 2a and 3 of the By-law provide for full exercise of authority under the enabling legislation. They comtemplate that the responsible official will have standards or specifications. From a legal point of view the By-law does not seem to require amendment either in regard to the provision of authority for making regulations or specifications or for their incorporation into it. Keeping the specifications (Appendix 2) separately rather than embodying them in the By-law provides for greater flexibility in amending them more easily and expeditiously if the need arises.

Issues	Comments
6. Loan Conditions	
Whether or not Section 5 of the By-law should be amended to specify the terms and conditions of loans, e.g. interest rate, term of loan, period of amortization and method of repayment, etc.?	The enabling legislation (Section 46, Subsection 23(a) of The Planning Act) provides for making of loans "on such terms and conditions as the Council may prescribe". It also provides for "interest at a rate not exceeding five per cent per annum" and for repayment "not exceeding five years". As already stated in Section 7.2.2 of this report the provision about the interest rate in the above-mentioned enabling legislation has been amended to say "at a rate to be determined by Council". The City so far has had no loan program in operation and the subject is rather academic. However, if at some stage it is considered necessary to change the period of repayment beyond five years, it will require amendment to the enabling legislation. At this stage it may be sufficient to amend Section 5 of the By-law to say "on such terms and conditions including interest rate as the Council may prescribe".

Issues	Comments
7. Certification of Work	
Is it necessary to amend the By-law to require certification for satisfactory completion of work performed by Pest Control Operators?	It is not considered necessary to include the requirment in the By-law because the underlying intent is now being met by the "satisfactory completion certificate" required jointly by the City and the Ministry of the Environment (Appendix 3). No grants payments are made until such certificate is signed by the foreman of the pest control crew, the City Inspector and his senior supervisior and forwarded to the Buildings and Inspections Department and the Ministry of the Environment.

Issues	Comments
8. Reporting Requirements	
Should the By-law be amended to require mandatory reporting of all suspected, known and treated cases of infestation by owners, including owners of properties not eligible for termite control grants, as well as by Pest Control Operators who treat such properties?	The underlying intent is to ensure monitoring of infestation - including infestation, in properties not eligible for termite control grants. It is doubtful if authority for mandatory reporting can be provided for by amending the By-law without first amending the enabling legislation. Even if and when such authority is provided for, it will be almost impossible to police the requirement of suspected or known cases of infestation in properties not covered by the grants provision. However, through administrative arrangements between the Ministry of the Environment and the City, at least the cases of infestation treated privately by the pest control operators can be monitored without much difficulty. The Ministry can require such a list from pest control operators under the Ontario Pesticides Act.

Issues	Comments
9. Ownership Change Whether or not the enabling legislation and the By-law should be amended to provide for authority to require mandatory inspection and certification in regard to termite infestation at the time of transfer of ownership of property in termite prone areas?	The authority would first have to be provided for in the enabling legislation before the requirement is included in the By-law. However, the need for such a requirement seems to be questionable from the point of view of its negative implications for property values, and complications and administrative costs involved in its enforcement. The underlying intent can be met by strengthening the program of public information in areas prone to the risk of termite infestation, monitoring of sale of properties in such areas and alerting of new owners of the possible risk followed by inspection of property and advice to owners by the City staff.

City of Toronto
DEPARTMENT OF BUILDINGS AND INSPECTIONS

General Specifications — Termite Control

To be observed by the Property Owner and the Pest Control Operator in the performance of work to render premises resistant to infestation by Termites.

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1. **OPERATOR QUALIFICATION:** The Pest Control Operator must be licensed by the Province in accordance with the Pesticides Act.

2. **MECHANICAL ALTERATIONS:** The owner will observe recommended good practice in making mechanical alterations consistent with the particular circumstances existing in the building, specifically:

   a) Removal of all loose and vulnerable material, that is in contact with the soil, or infested, but is not part of the structure.

   b) Access to be made to all enclosed areas for inspection and treatment and cross ventilation installed in these areas, where necessary.

   c) Removal of soil under an unexcavated portion to a minimum of 45 cm (18 in.) in depth.

The owner shall make further alterations where considered essential by the Operator or the Buildings and Inspections Department in order to maintain the effectiveness of the soil sterilization program, specifically:

   a) Replacement of structural material infested beyond repair.

   b) Correction of conditions creating abnormal moisture, specifically: — grading around the structure, repair or installation of drainage systems and repair or replacing of eaves-troughing, etc.

   c) Replacement by impervious material of wooden structural members in contact with the soil or breaking contact between soil and wood with a suitable non-cellulose mechanical barrier.

   d) All infested or other material (i.e. soil, wood, etc.) that requires removal from the property is to be disposed of in one of the following manners:

      (i) Large quantities to be removed from the site in steel boxes which are adequately covered and secured to avoid spillage in transit.

      (ii) Lesser quantities may be removed from the site in properly filled steel barrels or similar non-cellulose containers which are adequately covered and secured to avoid spillage in transit.

      (iii) Small quantities may be removed from the site through normal municipal garbage pick-up, however, must not remain at the curb or normal pick-up site for longer than 12 hours.

3. **CHEMICALS TO BE USED:** The Operator shall observe recommended good practice in using only the chemicals as listed and generally in accordance with the qualtities indicated:

   CHLORDANE: To be used 1% by weight, in water an an emulsion.

   ALDRIN: To be used 0.5% by weight in water as an emulsion.

4. OUTSIDE FOUNDATION TREATMENT:

PREPARATION: Where soil is exposed no preparation is required, however, where soil is covered with asphalt or concrete, holes shall be drilled every 20 cm. to 30 cm. (8 to 12 inches) along the foundation walls.

TREATMENT: The chemical emulsion shall be injected into the soil under pressure every 20 cm. to 30 cm. (8 to 12 inches) either through the drilled holes or directly into the exposed soil by rodding to a depth of 2 meters (6½ feet) or to the footings whichever is lesser. Chemical emulsion to be injected at the rate of 4.5 litres (1 gal.) per 30 lineal cm. (1 lineal ft.) for each 1.52 metres (5 ft.) of depth of soil from footings to grade.

5. INSIDE FOUNDATION TREATMENT: Covered Soil:

PREPARATION: Where the soil to be treated is covered with such structures as brick or concrete it shall be uncovered for treatment or the treatment applied through holes drilled every 30 cm. to 45 cm. (12 to 18 in.) within 15 cm. to 30 cm. (6 to 12 in.) from the foundation wall.

TREATMENT: Of foundation covered soil: At the rate of 2 litres per 30 lineal c. (1/2 gal. per lineal foot) under pressure, with a sub-slab injector.

6. AROUND SUPPORT PIERS, CHIMNEY BASES, PIPE AND SIMILAR UNITS:

PREPARATION: To be prepared for treatment on all sides in the same manner as listed for inside foundation walls covered soil.

TREATMENT: At the rate of 0.5 litres per 900 sq. cm. (1 pint per sq. ft.) under pressure using sub-slab injector.

7. INTO SUPPORT PIERS CONTAINING VOIDS — i.e. Brick, Cement block, etc.

PREPARATION: Drill holes into each void from the side of the pier at a height of no less than 90 cm. (3 ft.) from the base of the pier or cellar floor.

TREATMENT: At the rate of 2 litres (1/2 gal.) injected into each pier under pressure using sub-slab injector.

8. EXPOSED SOIL AREAS UNDER STRUCTURES:

PREPARATION: These areas having been made as level as possible and adequate clearance made to a minimum of 45 cm. (18 in.) between the lowest wood member and the soil.

TREATMENT: Flood entire surface of the exposed soil at the rate of 0.5 litres per 900 sq. cm. (1 pint per sq. ft.)

9. TREATMENT FOR SLAB ON GRADE, CONSTRUCTION AND UNDER PATIO GARAGE OR SIDEWALK AREAS:

PREPARATION: Due to the possible hazards of drilling through heat pipes, electrical conduits, gas lines, etc., it may be advisable to treat the above areas from the outside, and it may be necessary in this regard to trench along the exterior wall and drill horizontally every 45 cm. (18 in.) through the foundation wall or footings just below the level of the slab floor. Where no foundation wall or footings exist it may be feasible to utilize angle rodding under the exposed edge of the concrete slab every 30 cm. to 40 cm. (12 to 16 in.) Rod as close to the horizontal as possible and in any event not exceeding an angle of 45 degrees from the horizontal plane. If these method are not possible treat in the same manner as for Inside Foundation Treatment.

TREATMENT: Flood under entire area at the rate of 0.5 litres per 900 sq. cm. (1 pint per sq. ft.) by rodding or sub-slab injector as required.

10. TREATMENT UNDER WOODEN FLOORS RESTING ON CONCRETE SLAB:

MECHANICAL ALTERATIONS: It may be necessary to remove wooden floors down to existing concrete or replace entire floor with new concrete to correct this condition, but if not feasible, chemical treatment will still be required.

PREPARATION: Drill through both wooden and cement floors around perimiter every 30 cm. to 45 cm. (12 to 18 in.).

TREATMENT: Flood under the entire area at the rate of 0.5 litres per 900 sq. cm. (1 pint per sq. ft.) both under the cement floor and between the cement and wooden floors with sub-slab injector.

11. SOIL UNDER MASONRY OR WOODEN PARTITION WALLS:

PREPARATION: Drill through concrete floor within 10 cm. to 15 cm. (4 to 6 in.) of partition wall every 30 cm. to 40 cm. (12 to 16 in.) and treat under floor using sub-slab injector. Where the partition wall is a main bearing wall, drilling both sides of wall every 30 cm. to 45 cm. (12 to 18 in) is necessary.

TREATMENT: At the rate of 2 litres per 30 lineal cm. (1/2 gal. per lineal foot) with a sub-slab injector.

12. FOUNDATION TREATMENT: (wall voids):

Types of foundation: Concrete block, hollow tile block, brick, stone and rubble, etc.

PREPARATION: Drill holes every 30 cm. to 40 cm. (12 to 16 in.) into the foundation wall void. Drilling will normally be made through the mortar joints above grade level, and chemical pumped therein.

TREATMENT: Treat at the rate of 4.5 litres (1 gal.) per 30 lineal cm. (1 lineal foot) for each 1.52 meters (5 feet) of foundation existing below grade using a sub-slab injector.

NOTE: Stop treatment if drill hole overflows or seepage appears at bottom of wall.

13. EQUIPMENT:

All Pest Control Operators must have and use the following basic equipment for the proper treatment of properties under the Termite Control Program:

a) A minimum of 61 meters (200 ft.) length of continuous high pressure hose in good condition stored in the vehicle and used in such a manner as to be free of any kinking or undue twisting. It is recommended that the operational end of the hose be fitted with a quick coupler device and it is required that this or any other form of connector is free of any leaking. It is required that this hosing and connectors be replaced at such frequent intervals as to ensure against the possibility of leaking or rupture.

b) Sub-slab injectors fitted with an expandable membrane or such other sealing device as to prevent any pressure back-wash from the hole that is being treated.

c) Rodding injectors of 1.22 meters (4 ft.) and 1.83 meters (6 ft.) for treatment of open soil areas.

d) A mixing tank of sufficient size; min 360 litres (80 gals.) fitted with motorized pressure pump and gauge that will provide a minimum pressure of 80 pounds per square inch at the injector device. The tank must also be fitted with an agitating device that will provide continuous agitation of the chemical mixture while the treatment is in progress.

e) All chemicals to be retained in original containers until used in the mixing tank and to be secured within an enclosed area in the vehicle during transportation on City streets.

f) In the event of accidental spillage of chemicals each operator must carry an adequate supply of absorbing material (i.e. sawdust), and equipment to soak up and remove same from the site of spill to a proper disposal site.

g) Each operator must have and use a vehicle properly equipped to carry all the above-mentioned items and equipment in such a manner as to pose no undue hazard to the general public.

14. WARRANTY:

All Pest Control Operators, upon completion of treatment of a property shall give to the customer a One Year Warranty Certificate. The Warranty must include a provision that should active Termite infestation be found in the structure(s) by the customer, the City Inspector, or the Pest Control Operator during the warranty period, the Pest Control Operator shall provide corrective treatment where required. This Warranty however, can become null and void if the customer undertakes any structural alterations that would render the treatment ineffective unless the customer arranges to have the area retreated by the Pest Control Operator.

The Pest Control Operator shall also offer to the customer an ongoing year to year Warranty at a fee to be agreed upon between the parties.

15. OWNER'S RESPONSIBILITY:

Following treatment of the property, it is the Owner's responsibility to ensure that the areas of treatment are not unduly disturbed so as to render the treatment ineffective. If however, circumstances dictate such disturbance (i.e. adding an addition to the structure, trenching for sewer or other services work, etc.), it is the Owner's responsibility to have these areas retreated by a Pest Control Operator.

These specifications dated March 1, 1982 supercede and replace any previous specifications related to Termite Control of Existing Structures.

This is to acknowledge that a copy of the General Specifications — Termite Control, has been received and it is understood that they form part of the agreement between the Pest Control Operator and the Owner, and/or the Owner's Agent.

Upon receiving estimates from two (2) firms, please forward this page, the application for the grant and the estimates to the:

City of Toronto,
Department of Buildings and Inspections,
17th. Floor, East Tower,
City Hall, Toronto,
Ontario M5H 2N2

Owner's Signature: _____

Exterminator's Signature: _____

This is to acknowledge that a copy of the General Specifications — Termite Control, has been received and it is understood that they form part of the agreement between the Pest Control Operator and the Owner, and/or the Owner's Agent.

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APPENDIX 3

CITY OF TORONTO
DEPARTMENT OF BUILDINGS AND INSPECTIONS
AND
MINISTRY OF THE ENVIRONMENT
TERMITE CONTROL PROGRAM

SATISFACTORY COMPLETION CERTIFICATE

MUNICIPALITY:	DATE:
INSPECTOR'S NAME:	OWNER:
PROPERTY ADDRESS:	
PEST CONTROL CO. NAME:	MINISTRY FILE NO.
CREW FOREMAN'S NAME:	

		CHECK ONE		
		YES	NO	NOT REQUIRED
1.	All wood/soil contact has been removed	☐	☐	☐
2.	Inspector was on site to observe insecticide being applied:			
	(a) by rodding	☐	☐	☐
	(b) by sub-slab injector	☐	☐	☐
* 3.	Holes, spaced 8" - 12" apart, have been drilled into the outside foundation wall above grade level, and chemical has been applied.	☐	☐	☐
* 4.	Holes have been drilled below all basement windows and chemical injected.	☐	☐	☐
5.	Holes, spaced 8" - 12" apart, have been drilled along outside foundation wall around entire perimeter, and chemical injected to depth of footings by rodding.	☐	☐	☐
6.	All garages, trees and fence lines have been probed by rodding around perimeter.	☐	☐	☐
7A	All outside masonry stairs have been drilled, and treated in each riser or tread.	☐	☐	☐
7B	All outside pre-cast concrete steps have been drilled to allow chemical treatment of soil beneath and behind unit.	☐	☐	☐
8.	All brick or cement-block porch support piers have been drilled and treated into interior void, and on all sides around base.	☐	☐	☐
9.	All unexcavated areas, including under the porches, have been cleared of debris, levelled and flooded with chemical.	☐	☐	☐
10.	Holes, spaced 12" - 16" apart, have been drilled around entire perimeter of basement and chemical injected under basement floor slab by sub-slab injector.	☐	☐	☐
11.	Holes, spaced 12" - 16" apart, have been drilled along one side of all partition walls and along both sides of interior bearing walls, and chemical injected beneath basement floor slab by sub-slab injector.	☐	☐	☐
12.	Holes, spaced 12" - 16" apart, have been drilled into all inside bearing walls above interior grade level, and chemical has been applied.	☐	☐	☐
12A	If foundation wall or bearing wall is of rubble construction, test holes have been drilled at usual spacing to check for voids, and chemical has been injected where possible.	☐	☐	☐

Continued on reverse:

	CHECK ONE		
	YES	NO	NOT REQUIRED
13. All support piers with voids have been drilled and treated into interior void, and on all sides around base.	☐	☐	☐
14. Drill holes, to allow chemical treatment, are evident in the basement slab, where it meets the stairway stringer and support posts.	☐	☐	☐
15. All cracks along the indoor basement slab have been drilled and chemically treated.	☐	☐	☐
16. All drill holes have been thoroughly sealed by means of plastic plugs or good quality mortar.	☐	☐	☐

* *Due to different types of construction, it may be possible to carry out above and below grade treatment of bearing and foundation walls from either indoors or outdoors.*

I hereby attest that termite treatment on this property has been completed according to the guidelines laid down by this Municipality and the Ministry of the Environment.

Signed: _____ *Pest Control Crew Foreman or Supervisor*

IMPORTANT: Crew Foreman — After you have completed this form, please give or forward it directly to the Building Inspector for his signature.

This is to advise that the above noted property has to the best of my knowledge been satisfactorily treated in accordance with the above listed requirements against termite infestation as follows:

BOTH WOOD/SOIL CONTACT AND CHEMICAL TREATMENT COMPLETED ☐

CHEMICAL TREATMENT ONLY ☐

WOOD/SOIL CONTACT BROKEN ☐
(only where previous treatment has been done and the pertinent areas have been retreated).

I therefore recommend that the applicable grant payment(s) be made accordingly.

_____ _____

INSPECTOR'S SIGNATURE *SENIOR/SUPERVISOR'S SIGNATURE*

N.B. If any "no's" are recorded on this checklist, it is not a satisfactory Completion Certificate, unless an adequate explanation is provided below.

N O T E S

1. Kirby, C.S., Canada Department of Forestry and Rural Development Forestry Branch, Information Report 1963, April 1, 1963 - "Termites in Ontario, with Particular Reference to the Toronto Region". The report gives a description of termites, a brief history of the problem and results of surveys of growth of termites in Toronto conducted in 1948-49, 1952-53 and 1962. (Section 3.3, p.11)

2. Hughes, C.A., Director, Research and Information. Report submitted by the Commissioner of Development, dated January 23, 1975, to the City of Toronto Executive Committee, pp 15-16. The review of the termite control program contained in the report is discussed in Section 4.3. (Section 3.3, p.12)

3. The provisions were enacted by the Provincial Legislature as Sub-sections 21a and 21b of Section 31(1) of The Planning Act. At the time of writing they are contained in Sub-sections 22 and 23 of Section 46(1) of The Planning Act. Revised Statutes of Ontario, 1980, Chapter 379 as amended by 1981, Chapter 15, February 1982. The provisions have now been transferred from The Planning Act to Section 210 of the Municipal Act, paragraphs 173 and 174. On proclamation the amended Municipal Act takes effect from August 1, 1983. (Section 4.2.1, p.17)

4. On October 9, 1968, the City passed Building By-law No. 300-68, in which the provisions in regard to termites (originally enacted on September 17, 1963 as By-law No. 21927 as an amendment to the then Building By-law No. 9868) appear in Chapter 7, Section 25. The Building By-law has since been superseded by the Ontario Building Code in 1975. (Section 4.2.1, p.17)

5. On June 20, 1973, the City enacted a further By-law No. 189-73 which repealed the original By-law No. 22272 passed in October 1963. By-law No. 189-73 as subsequently amended is presently the City's Termite Control By-law. (Section 4.2.1, p.17)

6. The agreement was authorized by By-law No. 213-77A, dated April 21, 1977 and subsequently amended by By-law No. 514-77 dated August 4, 1977 and By-law No. 737-77 dated November 21, 1977. (Section 5.1, p.25)

7. Cooper, Paul A. and Morris, R., Faculty of Forestry, University of Toronto, 1981 - Rationalization of Research and Policies for Control of Subterranean Termite - Final report prepared for Canada Mortgage and Housing Corporation, External Research Program, Ottawa, 1981, p. 71. (Section 7, p.38)

8. Pesticides Act, Revised Statutes of Ontario, 1980, Chapter 376 as amended by 1981 Chapter 51 and Regulation 751, Revised Regulations of Ontario, 1980, as amended by O. Reg. 2521 81,

O. Reg. 6161 81, O. Reg. 7561 81, January 1982. (Section 7.2.4, p.43)

9. Cutten, Geoff, Entomologist, Pesticide Control Section, Ontario Ministry of the Environment, letter dated April 14, 1982. (Section 9, p.52)

10. A block is considered as infested where one or more houses were infested during the period under review. (Section 9, p.52)

11. Cooper, Paul A., University of Toronto Faculty of Forestry, The Subterranean Termite (Reticulitermes Flavipes) - Its Activity and Control in Shade Trees, 1981. (Section 9.3, p.71)

12. Cooper, P.A. and Morris, R., Faculty of Forestry University of Toronto, 1981, Retionalization of Research and Policies for Control of Subterranean Termite, final report prepared for Canada Mortgage and Housing Corporation, External Research Program, Ottawa, 1981. (Section 10.1, p.76)

13. Ibid, pp. 42-53. (Section 10.4, p.81)